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By a SOCIETY of GENTLEMEN.

The SECOND EDITION,
With many ADDITIONS, CORRECTIONS, and other IMPROVEMENTS.

——————Hic undique Gaza
Congeritur —————— VIRG.

VOL. II.

LONDON:
Printed for W. OWEN, at Homer's Head, in Fleet-ſtreet.
M DCC LXIII.

THE INSTITUTE OF MEDIAEVAL STUDIES
10 ELMSLEY PLACE
TORONTO 5, CANADA.

DEC 28 1931

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A NEW AND COMPLETE

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D, One of the letters of the alphabet, the fourth in order, and the third conſonant. It is formed in the voice, by applying the top of the tongue to the fore-part of the palate, and then ſeparating them with a gentle guſt of the breath, the lips being at the ſame time open.

Grammarians generally rank D among the lingual letters, becauſe the tongue has the principal ſhare in its pronunciation; but the abbot de Dangeau makes it a palatal one. It has but one ſound, ſomewhat related to that of T.

The form of our D is the ſame with that of the Latins, as appears by antient medals and inſcriptions. And the D of the Latins is only the Greek Δ made a little rounder, by being made quicker, and at two ſtrokes only.

The letter D has the ſame name, and poſſeſſes the ſame place, in the Hebrew, Chaldee, Samaritan, Syriac, Greek, and Latin alphabets, though ſomewhat differently pronounced; as in the Hebrew, Chaldee, and Samaritan Daleth, in the Syriac Dolath, and in the Greek Delta.

As a numeral, D denotes 500; and with a daſh over it, thus $\overline{D}$, 5000. Uſed in abbreviation, it has various ſignifications: thus, D. ſtands for doctor, as M. D. doctor of medicine; D. T. doctor of theology; D. D. ſignifies doctor of divinity, or dono dedit; D. D. D. is uſed for dat, dicat, dedicat; and D. D. D. D. for dignum deo donum dedit.

Among roman writers D ſtands for *divus*, *decimus*, *devotus*, *diebus*, and *diutius*. Among muſicians D marks, in thorough baſſes, what the italians call deſcanto, and intimates, that the treble ought to play alone, as T does the tenor, and B the baſs. See the article DESCANT.

D C, in the italian muſic, an abbreviation of da capo, that is, from the head, or beginning; theſe words, or letters, being commonly met with at the end of rondeaus, or ſuch airs and tunes as end with the firſt ſtrain, intimate that the ſong is to be begun again, and ended with the firſt part.

DAB, in ichthyology, the engliſh name of a ſpecies of pleuronectes, with the eyes on the right ſide, obtuſe teeth, a ſpine near the anus, and the body defended by rough ſcales. See PLEURONECTES.

DABUL, a port town in the province of Decan, on the weſtern coaſt of the hither India, north lat. 17° 30′, eaſt long. 72° 30°.

DACA, a city of the province of Bengal, in the Eaſt Indies, ſituated on a branch of the river Ganges, eaſt long. 89°, and north lat. 23° 30′.

DA CAPO. See D C, *ſupra*.

DACE, the engliſh name of a ſpecies of cyprinus, very common in our rivers: it is longer and more ſlender than the roach, and has ten rays in the fin beſide the anus. See the article CYPRINUS.

The dace is the ſlendereſt and moſt rounded in the body of all the cyprini; its uſual length is about ſix or ſeven inches, though it will grow much larger. See plate LXVII. fig. 1.

DACQS, DAX, or ACQS, a city in France, capital of the territories of les Landes, in the province of Gaſcony, ſituated on the river Adour, weſt long. 1° north lat. 43° 45′.

DACTYL, δακτυλος, *dactylus*, in antient poetry, a metrical foot, conſiſting of one long and two ſhort ſyllables, as ἄλκιμος, and mūrmŭrĕ.

The dactyl and ſpondee are the only feet or meaſures uſed in hexameter verſes; the former being eſteemed more ſprightly, and the latter more ſolemn and grave. Accordingly, where great activity is ſignified, we find the dactyls uſed with much propriety, as in the following verſes of Virgil.

Quadrupedante putrem ſonitu quatit ungula campum.

DACTYLI, in antiquity, a name attributed to the firſt prieſts of the goddeſs Cybele, who were particularly called *Dactyli Idæi*, becauſe ſhe was principally honoured on mount Ida in Phrygia. The name Dactyli is ſuppoſed to be given them on this occaſion, that to prevent Saturn from hearing the cries of Jupiter, whom Cybele had committed to their cuſtody, they uſed to ſing verſes of their own invention, which, by their unequal meaſures, ſeemed to reſemble the foot Dactylus.

Sophocles ſays they were called Dactyli, from the greek δάκτυλος, finger, by reaſon their number was equal to that of the fingers, *viz.* ten, five boys, and five girls; he adds it is to them we owe the invention of iron, and the manner of working it. It is a conjecture, that the curetes and corybantes were not the ſame with the dactyli idæi; that 100 men born in Crete were firſt called dactyli; that each of them had nine children, who were the curetes, and that each of the curetes had ten children, who were alſo called dactyli idæi. M. Beger makes the dactyli inventors of the art of ſhooting with bows and arrows.

DACTYLIC VERSES, in antient poetry, hexameter verſes ending with a dactyl. See DACTYL and HEXAMETER.

DACTYLIOMANCY, *dactyliomantia*, a ſort of divination, performed by means of a ring; conſiſting chiefly in holding the ring ſuſpended by a fine thread over a round table, on the edge whereof were made ſeveral marks with the twenty-four letters of the alphabet; and as the ring, in ſhaking or vibrating over the table, happened to ſtop over certain of the letters, theſe being joined together, compoſed the anſwer required.

DACTYLIS, in botany, a genus of the triandria-digynia claſs of plants, the flower of which is a bivalve glume, and its fruit a ſingle roundiſh ſeed, contained in the cup and flower.

DACTYLUS, DACTYL, in poetry. See the article DACTYL.

DACTYLUS, among antient botaniſts, the ſame with DATE. See DATE.

DADO, in architecture, the ſame with the dye. See the article DYE.

DADUCHI, in antiquity, prieſts of the goddeſs Ceres, ſo called, becauſe, at the feaſts and ſacrifices of that goddeſs, they ran about the temple, carrying a lighted torch, which they delivered from hand to hand, till it had paſſed through them all. This they did in memory of Ceres's ſearching for her daughter Proſerpine, by the light of a torch, which ſhe kindled in mount Ætna.

DÆDALA, δαιδαλα, in antiquity, two feſtivals in Bœotia, one of which was obſerved by the Platæans at Alalcomenus, where was the largeſt grove in all Bœotia. Here they aſſembled, and expoſing to the open air pieces of ſodden fleſh, carefully obſerved whither the crows that came to feed upon them took their flight, and then hewed down all thoſe trees on which any of them alighted, and formed them into ſtatues, which by the antient greeks were called *dædala*. The other ſolemnity was by far the greateſt and moſt remarkable of the two, being celebrated only once in ſixty years.

DÆDIS, Δαιδις, among the greeks, a ſolemn feſtival that laſted three days, during all which time torches were kept burning, which gave occaſion to the name.

DÆMON, δαιμον, a name given by the antients to certain ſpirits, or genii, which, they ſay, appeared to men, either to do them ſervice, or to hurt them. The Platoniſts diſtinguiſh between gods, dæmons, and heroes. The gods are thoſe whom Cicero calls *Dii majorum gentium*. The dæmons are thoſe whom we call angels. See the article ANGEL.

Chriſtians, by the word dæmon underſtand only evil ſpirits, or devils. Juſtin Martyr ſpeaks of the nature of dæmons, as if he thought them not abſolutely ſpiritual and incorporeal, for which reaſon he attributes ſuch actions to them as cannot be performed without the intervention of a body. It was a fabulous notion among the antient Hebrews, that Adam begot dæmons and ſpirits on certain ſuccubuſes. It is difficult to come at a ſatisfactory account of the dæmonology of that people, and therefore it is no eaſy matter to explain what is meant by the worſhipping of dæmons, or devils, which is the laſt ſpecies of idolatry, according to the diviſion of the rabbins.

“The poets, ſays Minucius Fælix, acknowledge the exiſtence of dæmons; the philoſophers make it a matter of diſpute. Socrates was convinced of it, for he had a dæmon always at hand, by whoſe advice he governed himſelf in all his actions: the magi are not only acquainted with dæmons, but perform all their magical operations by the help of dæmons.”

The mahometans allow ſeveral ſorts of dæmons; and the miners of Hungary, pretend that, while they are at work in the mines, they often ſee dæmons in the ſhape of little negro boys, doing them no other harm than often extinguiſhing their lights.

DÆMONIAC, a word applied to a perſon ſuppoſed to be poſſeſſed with an evil ſpirit, or dæmon. See DÆMON.

In the romiſh church there is a particular office for the exorciſm of Dæmoniacs. See the article EXORCISM.

DÆMONIACS, in church hiſtory, a branch of the anabaptiſts, whoſe diſtinguiſhing tenet is, that the devils ſhall be ſaved at the end of the world.

DÆSION, the macedonian name of the month called by the Athenians, antheſterion. See the article ANTHESTERION.

DAFFODIL, the ſame with the narciſſus of botaniſts. See NARCISSUS.

DAFFODIL LILY, the lilio-narciſſus of botaniſts. See LILIO-NARCISSUS.

Sea-DAFFODIL, a genus of plants called by latin writers pancratium. See the article PANCRATIUM.

DAGO, or DAGERWORT, the capital of an iſland of the ſame name in the Baltic, near the coaſt of Livonia, ſubject to Ruſſia, eaſt long. 21° 30′, and north latit. 58° 45′.

DAHGESTAN, a country of Aſia, bounded by Circaſſia on the north, by the Caſpian Sea on the eaſt, by Chirvein, a province of Perſia on the ſouth, and by Georgia on the weſt. Its chief towns are Tarku and Derbent, both ſituated on the Caſpian Sea.

DAHOME, a kingdom of Africa, on the Guinea-coaſt.

DAILE, in the ſea-language, ſignifies the trough for carrying the water off the decks.

DAIRY, a houſe or building where milk, butter, cheeſe, *&c.* are made or kept. See the articles MILK, BUTTER, *&c.*

DAISY, the engliſh name of a genus of plants, called by authors bellis. See the article BELLIS.

DAKER-HEN, a bird, otherwiſe called ortygometra. See ORTYGOMETRA.

DALEBURGH, the capital of the province of Dalia, in Sweden, ſituated on the weſtern ſide of the Wener-lake, fifty miles north-eaſt of Gottenburgh, eaſt lon. 13°, and north lat. 59°.

DALECARLIA, a province of Sweden, abounding with iron and copper mines.

This is alſo the name of a river, which gives name to the above province.

DALECHAMPIA, in botany, a genus of the polygamia-monoecia claſs of plants. There is no corolla, either in the male or female flower: the fruit is a globoſo-triangular ſcabrous capſule, with three cells: the ſeeds are roundiſh and ſolitary.

DALIA, a province of Sweden, bounded on the north by Dalecarlia, on the eaſt by Wermeland and the Wener-lake, on the ſouth by Gothland, and on the weſt by Norway.

DALKEITH, a town of Scotland, in the county of Lothian, four miles ſouth eaſt of Edinburgh, weſt long. 2° 40′ and north lat. 55° 50′

DALIBARDA, in botany, a genus of the icoſandria-polygynia claſs of plants, the calyx of which conſiſts of a ſingle leafed perianthium, divided into five ſegments; the corolla conſiſts of five oval, equal petals, inſerted into the cup: there is no pericarpium; the ſeeds are five in number, oval, ſmooth, and almoſt of the length of the cup.

DALMATIA, a frontier province of Europe, moſtly ſubject to the Turks, but ſome towns on the ſea-coaſt to the Venetians: it is bounded by Boſnia on the north, by Servia on the eaſt, by Albania on the ſouth, and by Morlachia and the gulph of Venice on the weſt.

DAM, or DIKE, See the article DIKE.

DAMA, the FALLOW-DEER, in zoology, a ſpecies of the deer-kind, diſtinguiſhed by its ramoſe and compreſſed, or palmated horns. See CERVUS.

DAMAGE, in law, is generally underſtood

ſtood of a hurt, or hindrance attending a perſon's eſtate: but, in common law, it is a part of what the jurors are to inquire of in giving verdict for the plaintiff or defendant, in a civil action, whether real or perſonal: for after giving verdict on the principal cauſe, they are likewiſe aſked their conſciences, touching coſts and damages, which contain the hindrances that one party hath ſuffered from the wrong done him by the other. See the article COSTS.

DAMAGE-CLEER, was a fee of the tenth part in the common pleas, and twentieth in the king's-bench and exchequer, formerly paid out of all the damages, exceeding five marks, recovered in thoſe courts, in actions of the caſe, covenant, treſpaſs, and all others wherein the damages were uncertain.

DAMAGE FEASANT, is when a ſtranger's beaſts get into another man's ground, without licence of the owner or occupier of the ground, and there do damage by feeding, or otherwiſe, to the graſs, corn, wood, *&c.* in which caſe the tenant whom they damage may therefore take, diſtrain, or impound them, as well in the night as in the day; but in other caſes, as for rents and ſervices, and ſuch like, none may diſtrain in the night.

DAMAN, a port town of the hither India, in the province of Guzurat, or Cambay, ſituated on the weſt coaſt, about eighty miles ſouth of Surat, in 72° 20′ eaſt long. and 20° north lat.

It is ſubject to the Portugueſe.

DAMASCUS, or SCHAM, the capital city of the ſouth part of Syria, ſituated ninety miles north eaſt of Jeruſalem, in a pleaſant, extenſive, and fruitful plain; eaſt longit. 37° 20′, and north latit. 33° 15′.

DAMASK, a ſilk-ſtuff, with a raiſed pattern, ſo as that the right ſide of the damaſk, is that which hath the flowers raiſed or ſattined.

Damaſk ſhould be of dreſſed ſilk, both in warp and woof; and in France, half an ell in breadth: they are made at Chalons in Champagne, and in ſome places in Flanders, as at Tournay, *&c.* intirely of wool, $\frac{3}{8}$ of an ell wide, and 20 ells long.

DAMASK is alſo applied to a very fine ſteel, in ſome parts of the Levant, chiefly at Damaſcus in Syria; whence its name. It is uſed for ſword and cutlaſs blades, and is finely tempered. See STEEL.

DAMASKEENING, or DAMASKING, the art or operation of beautifying iron, ſteel, *&c.* by making inciſions therein, and filling them up with gold and ſilver wire; chiefly uſed for adorning ſword-blades, guards and gripes, locks of piſtols, *&c.*

Damaſkeening partakes of the moſaic, of engraving, and of carving: like the moſaic, it hath inlaid work; like engraving, it cuts the metal repreſenting divers figures; and as in chaſing, gold and ſilver is wrought in relievo. There are two ways of damaſking, the one, which is the fineſt, is when the metal is cut deep with proper inſtruments, and inlaid with gold and ſilver wire: the other is ſuperficial only.

DAMBEA, the capital of Abyſſinia, or Ethiopia, ſituated at the head of a lake, to which it gives name: eaſt long. 34°, and north lat. 15°

DAMELOPRE, a kind of bilander, uſed in Holland for conveying merchandize from one canal to another; being very commodious for paſſing under the bridges.

DAMIANISTS, in church-hiſtory, a branch of the antient acephali-ſeveritæ. They agreed with the catholics in admitting the IVth council, but diſowned any diſtinctions of perſons in the Godhead; and profeſſed one ſingle nature, incapable of any difference; and yet, they called God, the Father, Son and Holy Ghoſt.

DAMIETTA, a port-town of Egypt, ſituated on the eaſtern mouth of the river Nile, four miles from the ſea, and a hundred miles north of Grand Cairo; eaſt long. 32°, and north lat. 31°.

DAMNATA TERRA, among chemiſts, the ſame with caput mortuum. See the article CAPUT.

DAMPS, in natural hiſtory, noxious ſteams and exhalations, frequently found in mines, pits, wells, and other ſubterraneous places.

Damps are generally reckoned of four kinds. The firſt, which is the moſt ordinary, the workmen in the mines know when it is coming, by the flame of their candle's becoming orbicular, and by its leſſening gradually till it goes quite out; as alſo, by the difficulty of breathing. Thoſe that eſcape ſwooning, ſeldom ſuffer any harm by it: but ſuch as ſwoon away, though they miſs of downright ſuffocation, are, on their recovery, tormented with very violent convulſions.

Their way of cure is to lay the perſon down on the earth, in a prone poſture, with a hole dug in the ground under his mouth; if this fail, they fill him full of good ale, and if that will not do, they conclude the caſe deſperate.

The ſecond kind is the peaſe-bloom damp, being ſo called from its ſmell: this damp, they ſay, always comes in the ſummer-time, but hath never been known to be mortal. The miners in the Peak of Derbyſhire, fancy it ariſes from the great number of red trefoil flowers, called by them honeyſuckles, with which the limeſtone meadows of the peak abound. Probably the ſmell of this damp gives timely notice to get out of the way.

The third is the moſt peſtilential, and the ſtrangeſt of all, if what is ſaid of it be true. They who pretend to have ſeen it, deſcribe it thus. In the higheſt parts of the roof of thoſe paſſages in a mine which branch out from the main grove, they ſee a round thing that hangs about the bigneſs of a foot-ball, covered with a film of the thickneſs and colour of a cobweb. If this bag ſhould be broke by a ſplinter, or any other accident, the damp immediately flies out, and ſuffocates all the company. The miners have a way of breaking it at a diſtance, by means of a ſtick and long rope; and when they have done this, they purify the place with fire. They will have it, that it flows from the ſteam of their bodies and candles, aſcends up into the higheſt part of the vault, and there condenſes; and that in time, a film growing over it, it becomes peſtilential.

The fourth is the fulminating, or fire-damp, whoſe vapour, being touched by the flame of a candle, preſently takes fire, and has all the effects of lightening, or fired gun-powder. Theſe are frequently met with in the coal-mines, and ſometimes, though rarely, in the lead-mines.

The pernicious damps in mines, ſhew abundantly, that nature affords inflammable air in ſome caſes; and we have found by experiments, that art can do the ſame, and that, very probably, on the ſame principles with the natural. Sir James Lowther, having collected the air of ſome of theſe damps in bladders, preſerved it ſo well, that when brought up to London, it would take fire at the flame of a candle, on being let out at the orifice of a piece of tobacco-pipe. It is well known to all that are verſed in chemical experiments, that moſt metals emit a great quantity of ſulphurous vapours, during the efferveſcence they undergo in the time of their ſolutions, in their reſpective menſtruums: this vapour, being received into bladders, in the ſame manner with the natural air of Sir James Lowther, has been found to take fire, in the like way, on being let out in a ſmall ſtream, and anſwering all the phænomena of the natural kind.

DAMSEL, from the french *damoiſel*, or *damoiſeau*, an appellation antiently given to all young people of either ſex, that were of noble or genteel extraction, as the ſons and daughters of princes, knights, and barons: thus we read of Damſel Pepin, Damſel Louis le Gros, Damſel Richard prince of Wales.

From the ſons of kings this appellation firſt paſſed to thoſe of great lords and barons, and at length to thoſe of gentlemen, who were not yet knights.

At preſent, damſel is applied to all maids or girls, not yet married, provided they be not of the vulgar.

DANAE, in antiquity, a coin ſomewhat more than an obulus, uſed to be put into the mouths of the dead, to pay their paſſage over the river Acheron.

DANCE, an agreeable motion of the body, adjuſted by art to the meaſures or tune of inſtruments, or of the voice.

Athenæus concludes, that in the early ages of antiquity, they accounted dancing an exerciſe becoming perſons of honour and wiſdom, and that, as ſuch, it had been eſteemed by the greateſt men in all ages. Thus, Homer calls Merion a fine dancer, and ſays, that the graceful mein and great agility which he had acquired by that exerciſe, diſtinguiſhed him above the reſt in the armies of either Greeks or Trojans. Dancing was in very great eſteem among the Greeks, even the Lacedemonians encouraged it: but, at Rome, we find the cuſtom was quite otherwiſe; for there, to uſe the words of Cicero, no man dances unleſs he is mad or drunk: Cicero reproaches Gabinius with having danced: and we read, that Domitian excluded ſeveral members from the ſenate for having danced.

Dancing in general, was by the antients divided into cubiſtic, ſpheriſtic, and orcheſtic: the cubiſtic dance was performed with certain wreſtlings and contorſions of the body; the ſpheriſtic with a ſort of ball, or bowl play; but the orcheſtic was moſt uſual, and what indeed was dancing properly ſo called.

Dancing is uſually an effect and indication of joy, though Mr. Palleprat aſſures us, that there are nations in South America, who dance, to ſhew their ſorrow. It has been in uſe among all nations civilized and barbarous, though held in eſteem among ſome, and in contempt among others. It has often been, and ſtill is, ſometimes, made an act of religion. Thus David danced before the ark, to honour God, and expreſs his exceſs of joy, for its return into Sion. Among the Pagans it made a part of the worſhip paid to the Gods, it being uſual to dance round the altars, and ſtatues; and at Rome, the ſalii, who were prieſts of Mars, danced through the ſtreets in honour of that God. The poets made the Gods themſelves dance. The Chriſtians are not free from this ſuperſtition, for in popiſh countries certain feſtivals, particularly thoſe of the ſacrament, and paſſion of our Lord, are celebrated with dancing.

Rope-DANCER, *ſchoenobates*, a perſon who walks, leaps, dances, and performs ſeveral other feats upon a ſmall rope, or wire.

The antients had their rope-dancers, who had four ſeveral ways of exerciſing their art; the firſt vaulted, or turned round the rope, like a wheel round its axis, and there hung by the heels or neck. The ſecond flew or ſlid from above, downwards, reſting on their ſtomach, with the arms and legs extended. The third ran along a rope, ſtretched in a right line, or up and down. Laſtly, the fourth, not only walked on the rope, but made ſurpriſing leaps and turns thereon.

This art is lately much improved, as well in this nation as in France, and ſeveral other parts of Europe; witneſs the admirable feats of ſeveral rope-dancers, now in this country, who, ſtanding only with one foot on the wire, beat the drum, ſound the trumpet, play the violin, *&c.* and all the while the wire is in full ſwing. The other feats which they perform on the wire by the help of a balance, are too many to be enumerated here.

DANCETTE, in heraldry, is when the outline of any bordure, or ordinary, is indented very largely, the largeneſs of the indentures being the only thing that diſtinguiſhes it from indented. See the article INDENTED.

There is alſo the bearing of a bend, called double dancette: thus, he beareth azure, a bend double dancette argent.

DANCHE, in heraldry, the ſame with dantelle, according to Guillim: but Columbier makes it the ſame with indented. See the articles INDENTED and DANTELLE.

DANEGELT, a tax, or tribute, on every hide of land, impoſed on our anceſtors the Saxons by the Danes, on their frequent invaſions, as the arbitary terms of peace, and departure. It was firſt impoſed as a continual yearly tax upon the whole nation, under king Ethelred: It was levied by William I. and II. but was releaſed by king Henry the firſt; and finally aboliſhed by king Stephen.

DANIEL, *or book of* DANIEL, a canonical book of the old teſtament, ſo denominated from its author Daniel, who was a very extraordinary perſon, and was favoured of God, and honoured of men, beyond any that had lived in his time. His prophecies concerning the coming of the Meſſiah, and the other great events of after times, are ſo clear and explicit, that Porphyry objected to them, that they muſt have been written after the facts were done. The ſtile of Daniel is not ſo lofty and figurative as that of the other prophets; it is clear and conciſe, and his narrations and deſcriptions ſimple and natural; and, in ſhort, he writes more like an hiſtorian than a prophet.

The Jews do not reckon Daniel among the prophets; part of his book, that is from the 4th verſe of the 2d chapter to the end of the 7th chapter, was originally written in the chaldee language, the reaſon of which was, that in that part he treats of the chaldean or babyloniſh affairs; all the reſt of the book is in hebrew. The ſix firſt chapters of the book of Daniel are an hiſtory of the kings of Babylon, and what befel the Jews under their government. In the ſix laſt, he is altogether prophetical, foretelling not only what ſhould happen to his own church and nation, but events in which foreign princes and kingdoms were concerned.

DANK, a piece of ſilver current in Perſia, and ſome parts of Arabia, weighing the ſixteenth part of a drachm. It is alſo a weight uſed by the Arabians to weigh jewels and drugs.

DANTELLE, in heraldry, the ſame with dancette. See the article DANCETTE.

DANTZICK, the capital of regal Pruſſia,

in the kingdom of Poland, ſituated on the weſtern ſhore of the river Weſel, or Viſtula, which a little below falls into the Baltic Sea: eaſt long. 19°, and north lat. 54°.

It is an excellent harbour, and has the beſt foreign trade within the Baltic.

DANUBE, one of the largeſt rivers in Europe, which, taking its riſe in the Black Foreſt in Swabia, runs eaſtward through Bavaria, Auſtria, Hungary, and Turky in Europe; diſcharging itſelf by ſeveral channels into the Pontus Euxinus, or Black Sea.

DAPHNE, SPURGE LAUREL, in botany, a genus of the octandria monogynia claſs of plants, the flower of which conſiſts of a ſingle petal; the tube is cylindric, imperforated, and longer than the limb, which is divided into four oval, acute, plane, patent ſegments: the fruit is a roundiſh berry, containing one cell; the ſeed is ſingle, round and fleſhy.

This plant is a ſtrong cathartic, and too rough to be given with ſafety.

DAPIFER, the dignity or office of grand maſter of a prince's houſhold. This title was given by the emperor of Conſtantinople to the czar of Ruſſia, as a teſtimony of favour. In France the like officer was inſtituted by Charlemaign, under the title of Dapiferat; and the dignity of dapifer is ſtill ſubſiſting in Germany, the elector of Bavaria aſſuming the title of arch-dapifer of the empire, whoſe office is, at the coronation of the emperor, to carry the firſt diſh of meat to table, on horſeback.

DAPPLE-BAY, in the manege. When bay horſes have marks of a dark bay, they are called dapple bays.

DAPPLE-BLACK. When a black horſe has got ſpots or marks, more black or ſhineing than the reſt of his ſkin, he is called a dapple-black.

DARAPTI, among logicians, one of the modes of ſyllogyſms of the third figure, whoſe premiſes are univerſal affirmatives, and the concluſion is a particular affirmative: thus,

DAR- Every body is diviſible;
AP- Every body is a ſubſtance;
TI. Therefore, ſome ſubſtance is diviſible.

DARBY, the capital of Darbyſhire, ſituated on the river Darwent: weſt long. 1° 25′, and north lat. 53°.

It gives the title of earl to the noble family of Stanley, and ſends two members to parliament.

DARDANARIUS, or MONOPOLIST, a name antiently given to ſuch as occaſioned a ſcarcity of proviſions, particularly corn, by laying it up, to raiſe its price, in order to ſell it again at an extravagant rate. See MONOPOLY.

DARDANELLS, two caſtles at the entrance of the Helleſpont, where all ſhips going to Conſtantinople are examined: eaſt long. 27°, and north lat. 40° 5′.

DARE, in ichthyology, the ſame with dace. See the article DACE.

DARIEN, a province of Terra Firma, in ſouth America, being the narrow iſthmus, which joins north and ſouth America.

DARII, in logic, one of the modes of ſyllogiſm of the firſt figure, wherein the major propoſition is an univerſal affirmative, and the minor and concluſion particular affirmatives: thus,

DA- Every thing that is moved, is moved by another;
RI- Some body is moved:
I. Therefore, ſome body is moved by another.

DARK CHAMBER. See the article CAMERA OBSCURA.

DARK TENT, a portable camera obſcura, reſembling a deſk, and fitted with optic glaſſes, to take proſpects of landſkips, buildings, &c.

DARKING, a market-town of Surry, ſituated ten miles eaſt of Guilford, weſt long. 20′, and north lat. 51° 18′.

DARLINGTON, a market-town of the county of Durham, ſituated twenty miles ſouth of the city of Durham: weſt long. 1° 15′, and north lat. 54° 30′.

DARMSTAT, the capital of Heſſe-Darmſtat, in the circle of the upper Rhine in Germany, ſituated on a river of the ſame name, fourteen miles ſouth of Francfort, and thirteen ſouth-eaſt of Mentz: eaſt long. 8° 25′, and north lat. 49° 45′.

DARNEL, the engliſh name of the lolium of botaniſts. See the article LOLIUM.

DARREIN, in law, a corruption of the french word *dernier*, *laſt*, is uſed in this ſenſe in our law, as *darrein continuance*, &c.

Darrein preſentment, the laſt preſentation to a church, on which an aſſize lies.

DART, in aſtronomy, geometry, &c. See the article SAGITTA.

DARTFORD, a market-town of Kent, in the Dover-road, fourteen miles ſouth-eaſt of London: eaſt long. 16′, and north lat. 51° 25′.

DARTMOUTH, a borough and port-town of Devonſhire, ſituated on the engliſh channel, twenty-ſix miles ſouth of Exeter, which ſends two members to parliament: weſt long. 4°, and north lat. 50° 25′.

DARTUS, or DARTOS, in anatomy, the inner coat of the ſcrotum, compoſed of a great number of muſcular or fleſhy fibres, whence ſome conſider it as a cutaneous muſcle. It is by means hereof, that the ſcrotum is contracted or corrugated, which is eſteemed a ſign of health. See the article SCROTUM.

DARWENT, a river, which, riſing in the Peak of Darbyſhire, runs from north to ſouth through that county, and falls into the Trent.

DASYPUS, in zoology, the ſame with armadillo. See ARMADILLO.

DATA, among mathematicians, a term for ſuch things or quantities as are given or known, in order to find other things thereby that are unknown. Euclid uſes the word data (of which he hath a particular tract) for ſuch ſpaces, lines and angles as are given in magnitude, or to which we can aſſign others equal.

In algebra, the given quantities, or data, are expreſſed by the firſt letters of the alphabet, and the unknown quantities by the laſt letters; thus, if the problem be, from the ſum and product of two quantities given, to find the quantities themſelves, the quantities are repreſented by y and z; and $y + z = a$ the ſum given, and $yz = b$, the product given. See the article EQUATION.

DATA alſo expreſſes, in philoſophy and medicine, any quantity which for the ſake of a preſent calculation is taken for granted to be ſuch, without requiring an immediate proof for its certainty, called alſo the given quantity, number or power.

DATE, in law, is the deſcription of the day, month, year of our Lord, and year of the reign of the king, in which a deed or other writing was made. Antiently deeds had no dates but only of the month and year, and now, if in the date of any deed, the year of our Lord is right, though the year of the king's reign be wrong, it ſhall not hurt the ſame. A deed is good, though it has no date of the day, or if that be miſtaken, or though it contains an impoſſible date; but then he that pleads ſuch a deed, muſt ſet forth the time when it was delivered: for every deed or writing has a date in law, and that is the day of the delivery; and where there is none, a plaintiff, it is ſaid, may count it of any date.

In writings of importance, the date ſhould be written in words at length.

In letters, it is uſually written in figures.

An ante-date is a date prior to the real time when the inſtrument was ſigned.

A poſt-date is that poſterior to the real time when the inſtrument was paſſed.

DATE, *dactylus*, the fruit of the phoenix, or great palm-tree. See PHOENIX.

Dates are eſteemed moderately ſtrengthning and aſtringent, for which reaſon they are preſcribed for diarrhoeas that are habitual, for weakneſſes of the ſtomach, and for ſtrengthening the womb; but at preſent, we make little uſe of them in England. The beſt for medicinal purpoſes are thoſe of Tunis, and the country thereabout, of Egypt and many parts of the eaſt; the dates of Spain, and the ſouth of France, though they look well, being never perfectly ripe, and very ſubject to decay. They are to be choſen large, full, freſh, of a yellow colour on the ſurface, ſoft and tender, not too much wrinkled, and ſuch as have the pulpy part either of a good white throughout, or elſe reddiſh toward the ſurface, and white toward the kernel. Dates the hundred weight pay 1l. 14s. 4$\frac{20}{100}$d. on importation; and draw back on exportation 1l. 11s. 6d. They are preſerved in three different ways; ſome preſſed and dry, others preſſed more moderately; but the beſt are thoſe not preſſed at all, only moiſtened with the juice of other dates, as they are packed up in baſkets or in ſkins.

DATE-PLUM, in botany a name uſed by ſome for the dioſpyros, a diſtinct genus of plants. See DIOSPYROS.

DATISCA, in botany, a genus of the dioecia-decandria claſs of plants, the cup of which conſiſts of five leaves: there are no flower-petals; and its fruit is a triangular, unilocular capſule, containing a great number of ſeeds.

DATISI, in logic, a mode of ſyllogiſms in the third figure, wherein the major is an univerſal affirmative, and the minor and concluſion particular affirmative propoſitions. For example,

DA- All who ſerve God are kings;
TI- Some who ſerve God are poor;
SI. Therefore ſome who are poor are kings.

DATIVE, among grammarians, the third caſe

Fig. 1. DACE.

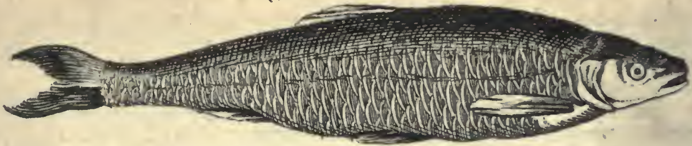


Fig. 2. DATURA.

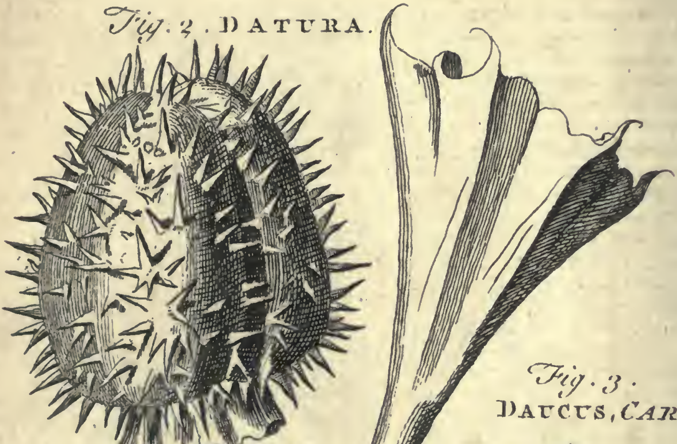


Fig. 3. DAUCUS, CARROT.

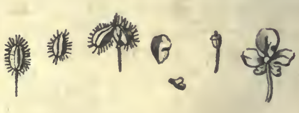


Fig. 4. DAVIT.

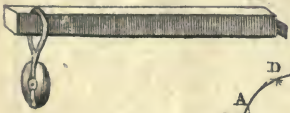
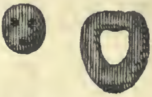


Fig. 5. DEAD-MENS-EYES



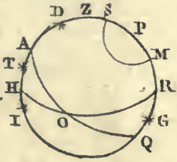


Fig. 6. DECLINATION.

Fig. 7. DECLINATOR.

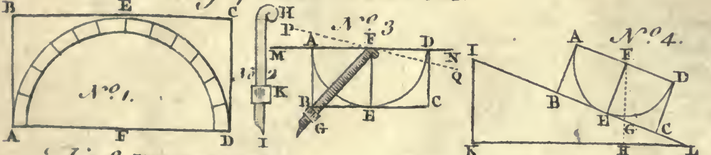
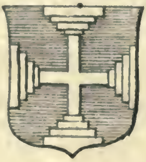


Fig. 8. DEGRADED.



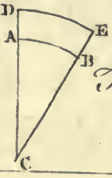


Fig. 9. DEGREE.

J. Jefferys sculp.

caſe in the declenſion of nouns, expreſſing the relation of a thing to whoſe profit or loſs ſome other thing is referred. It is called dative, becauſe uſually governed by a verb, implying ſomething to be given to ſome perſon. In engliſh, the dative is expreſſed by the ſigns *to* or *for*.

DATURA, THORN-APPLE, in botany, a genus of the pentandria-monogynia claſs of plants: the flower conſiſts of an infundibuliform petal; the fruit is a ſubovated, bilocular, quadrivalvular, and commonly prickly capſule, fixed to the baſe of the cup; the ſeeds are numerous and reniform. See plate LXVII. fig. 2.

The thorn-apple is narcotic, and dangerous to be taken internally; but a cataplaſm of its leaves and ſeed is commended for burns.

DAUCUS, the CARROT, in botany, a genus of plants belonging to the pentandria digynia claſs. The general flower is unequal: the proper one conſiſts of five inflexo-cordated petals, the exterior ones being the largeſt. There is no pericarpium: the fruit is of an oval figure every way covered with rigid hairs, and is diviſible into two parts: the ſeeds are two, of a ſuboval figure, convex and hairy on one ſide, and plain on the other. See plate LXVII. fig. 3.

There are two kinds of daucus-ſeeds kept in the ſhops, diſtinguiſhed by the names of daucus creticus, and daucus vulgaris. The ſeeds of the daucus creticus come principally from Germany and the Levant: theſe ſeeds are to be choſen freſh, ſound, and large, not duſty, and of an acrid taſte. They are very apt to breed inſects, and muſt, on that account, be carefully looked into, as they have no virtue when that is the caſe. The ſeeds of the cretic and common daucus have the ſame general virtues; they are powerful diuretics, and much celebrated as carminatives and uterines: they attenuate thick and viſcid humours, and promote the menſes. Many people eſteem the ſeed of the common daucus a remedy for the ſtone: the cretic kind is one of the four leſſer hot ſeeds of the ſhops.

DAVENTRY, a market-town of Northamptonſhire, ſituated about ten miles north of Northampton: weſt long. 1° 15′, and north lat. 52° 12′.

DAUGHTER, *filia*, a female child. See the article CHILD.

As they required greater expences to educate and ſettle them in the world, than ſons, they were for that reaſon more frequently expoſed by the antients. Thoſe who had no legitimate ſons, were obliged, by the athenian laws, to leave their eſtates to their daughters, who were confined to marry their neareſt relation, otherwiſe to forfeit their inheritance, as we find to have been practiſed among the Jews, many of whoſe laws ſeem to have been tranſcribed by Solon. And if an heireſs happened to be married before her father's death, this did not hinder the neareſt relation to claim the inheritance, and even to take the woman from her huſband.

DAUGHTER *of a voice*, among the Jews. See the article BATH-KOL.

DAVIDISTS, in church-hiſtory, a ſect of chriſtian heretics in the XVIth century; ſo called from David George, their leader, who began by giving out that he was the Meſſiah, and was ſent into the world in order to people the kingdom of heaven, which was quite empty of inhabitants, for want of virtuous and good men: he rejected marriage, and denied the reſurrection.

DAVID'S, or St. DAVID'S, a city, and biſhop's ſee, of Pembrokeſhire, ſituated near the iriſh channel, about twenty miles north weſt of Pembroke: weſt long. 5° 20′, and north lat. 52°.

ST. DAVID'S is alſo the name of a town and fort ſituated on the coaſt of Coromandel, in the hither India, about eighty miles ſouth of Fort Saint George: eaſt long. 79° 40′, and north lat. 11° 45′.

DAVIS'S STRAITS run north weſt from Cape Farewell, in 60° north lat. to Baffin's Bay, in 80° north lat. ſeparating Greenland from North America.

DAVIS'S QUADRANT, the ſame with backſtaff. See QUADRANT and BACKSTAFF.

DAVIT, in a ſhip, that ſhort piece of timber with a notch at one end, wherein, by a ſtrap, hangs the fiſh block. See plate LXVII. fig. 4.

The uſe of this block is to help up the fluke of the anchor, and to faſten it at the ſhip's bow, or loof. The davit is ſhiftable from one ſide of the ſhip to the other, as there is occaſion.

There is alſo a ſmall davit in the ſhip's boat, that is ſet over her head with a ſhiver, in which is brought the buoy rope, wherewith to weigh the anchor; it is made faſt to the carlings in the boat's bow.

DAUPHIN, a title given to the eldeſt ſon of France, and heir preſumptive of the crown, on account of the province of Dauphiny, which, in 1343, was given to Philip of Valois, on this condition, by Humbert, dauphin of the Viennois. The ſeigneurs, or lords of Auvergne, have likewiſe borne the appellation of dauphin, but the dauphins of Auvergne held it not till a good while after thoſe of the Viennois, and even received it from them.

Dauphin, in the hiſtory of ſhell-fiſh, a ſpecies of cochlea, or ſnail, with a round mouth. See the article Cochlea.

Dauphin-fort, a fort built by the French, on the eaſtern coaſt of the iſland of Madagaſcar: eaſt long. 48°, and ſouth lat. 24°.

DAUPHINE, or **Dauphiny**, a province of France, bounded by Burgundy on the north, by Piedmont on the eaſt, by Provence on the ſouth, and by the river Rhone, which ſeparates it from Languedoc and the Lyonois, on the weſt.

DAY, according to the moſt natural and obvious ſenſe of the word, ſignifies that ſpace of time during which it continues to be light; in contradiſtinction to night, being that partition of time wherein it is dark; but the ſpace of time in which it is light, being ſomewhat vague and indeterminate, the time between the riſing and ſetting of the ſun is uſually looked on as the day: and the time which lapſes from its ſetting to its riſing again, the night.

The word day is often taken in a larger ſenſe, ſo as to include the night alſo; or to denote the time of a whole apparent revolution of the ſun round the earth, in which ſenſe it is called by ſome a natural day, and by others an artificial one: but to avoid confuſion, it is uſual to call it in the former ſenſe ſimply the day, and in the latter a nychthemeron, by which term that acceptation of it is aptly denoted, as it implies both day and night.

The nychthemeron is divided into twenty-four parts, called hours, which are of two ſorts, equal and unequal, or temporary. See the article Hour.

Different nations begin their day at a different hour: thus the Egyptians began their day at midnight, from whom Hippocrates introduced that way of reckoning into aſtronomy, and Copernicus and others have followed him: but the greateſt part of aſtronomers reckon the day begun at noon, and ſo count twenty-four hours, till the noon of the next day; and not twice twelve, according to the vulgar computation. The method of beginning the day at midnight prevails alſo in Great Britain, France, Spain, and moſt parts of Europe. The Babylonians began their day at ſunriſing, reckoning the hour immediately before its riſing again the twenty-fourth hour of the day, from whence the hours reckoned in this way are called the Babylonic. In ſeveral parts of Germany, they begin their day at ſun-ſetting, and reckon on till it ſets next day, calling that the twenty-fourth hour: theſe are generally termed Italian hours. The Jews alſo began their nychthemeron at ſun-ſetting; but then they divided it into twice twelve hours, as we do, reckoning twelve for the day, be it long or ſhort, and twelve for the night; ſo that their hours continually varying with the day and night, the hours of the day were longer than that of the night, for one half year, and the contrary the other; from whence their hours are called temporary: thoſe at the time of the equinoxes became equal, becauſe then thoſe of the day and night are ſo. The Romans alſo reckoned their hours after this manner, as do the Turks at this day. This kind of hours are called planetary, becauſe the ſeven planets were antiently looked upon as preſiding over the affairs of the world, and to take it by turns each of theſe hours, according to the following order: ſaturn firſt, then jupiter, mars, the ſun, venus, mercury, and laſt of all the moon: hence they denominated each day of the week from that planet whoſe turn it was to preſide the firſt hour of the nychthemeron. Thus aſſigning the firſt hour of Saturday to ſaturn, the ſecond will fall to jupiter, the third to mars, and ſo the twenty-ſecond of the ſame nychthemeron will fall to ſaturn again, and therefore the twenty-third to jupiter, and the laſt to mars: ſo that on the firſt hour of the next day, it will fall to the ſun to preſide; and by the like manner of reckoning, the firſt hour of the next will fall to the moon; of the next, to mars; of the next, to mercury; of the next, to venus: hence the days of the week came to be diſtinguiſhed by the latin names of *dies ſaturni*, *ſolis*, *lunæ*, *martis*, *mercurii*, *jovis*, and *veneris*; and among us, by the names of Saturday, Sunday, Monday, *&c.*

Day, in a legal ſenſe, relates to the day of appearance of parties, or the continuance of ſuits, where a day is given, *&c.* See the article ESSOIN.

In real actions there are common days and ſpecial days given by the judges, in an aſſiſe, *&c.*

DAYS *in bank*, are days ſet down by ſtatute or order of the court, when writs ſhall be returned, or when the party ſhall appear on the writ ſerved. They ſay alſo, if a perſon be diſmiſſed without day, he is finally diſcharged.

DAYS *of grace*, are thoſe granted by the court at the prayer of the defendant, or plaintiff, in whoſe delay it is.

DAYS *of grace*, in commerce, are a cuſtomary number of days allowed for the payment of a bill of exchange, *&c.* after the ſame becomes due.

Three days of grace are allowed in England; ten in France and Dantzic; eight at Naples; ſix at Venice, Amſterdam, Rotterdam, and Antwerp; four at Frankfort; five at Leipſic; twelve at Hamburg; ſix in Portugal; fourteen in Spain; thirty in Genoa, *&c.*

DAY-LIGHT, in our law; ſome time after ſun-ſetting, and before ſun-riſing, being accounted part of the day, when the hundred is liable for any robberies committed within that time.

DAY'S-MAN, in the north of England, an arbitrator or perſon choſen to determine an affair in diſpute.

DAYS *of prefixion* in the exchequer, ſee the article REMEMBRANCERS.

Dog-DAYS, *dies caniculares.* See the article CANICULAR DAYS.

Lady-DAY. See the article LADY.

Quarter-DAY. See the article QUARTER.

Stationary DAYS. See STATIONARY.

Intercalary DAY. See INTERCALARY.

DAY-COAL, among miners, an appellation given to the upper ſtratum of the coal, or that which lies next the ſurface of the earth.

DAZE, among miners, denotes the ſame with the telaugia of naturaliſts. See the article TELAUGIA.

DEACON, διακονος, one of the three ſacred orders of the chriſtian church. The word is ſometimes uſed in the New Teſtament for any one that miniſters in the ſervice of God, in which ſenſe biſhops and preſbyters are ſtiled deacons; but in its reſtrained ſenſe, it is taken for the third order of the clergy, as appears from the concurrent teſtimony of antient writers, who conſtantly ſtile them miniſters of the myſteries of Chriſt, miniſters of epiſcopacy and the church, and the like. The firſt inſtitution of this order is recorded in Acts, ch. 6.

As to the office of deacons, the moſt common and ordinary was to be attendant on the biſhops and preſbyters in the ſervice of the altar, to take care of the holy table and all the ornaments and utenſils belonging to it, and, in the next place, to receive the offerings of the people, and to preſent them to the prieſt; at the ſame time reciting the names of thoſe that offered. In ſome churches, tho' not in all, the deacons read the goſpel both before and at the communion ſervice; but their moſt peculiar office was to aſſiſt the biſhop and preſbyters in the adminiſtration of the euchariſt, at which their buſineſs was to diſtribute the elements to the people who were preſent, and carry them to thoſe who were abſent. That they were never allowed to conſecrate them at the altar, appears from the teſtimonies of Hilary, Jerom, and the author of the conſtitutions. They were permitted, however, to adminiſter ſolely the ſacrament of baptiſm in ſome caſes. Another part of the office of deacons, was to be a ſort of monitors and directors to the people in the exerciſe of their public devotions in the church; for which purpoſe they made uſe of certain known forms of words, to give notice when each part of the ſervice began. Whence they are ſometimes called ἱεροκήρυκες, the holy cryers of the church. Deacons had, by licence and authority from the biſhop, a power to preach, to reconcile penitents and grant them abſolution, and to repreſent their biſhops in general councils. Their office out of the church was to take care of the neceſſitous, ſuch as orphans, widows, priſoners, and all the poor and ſick who had any title to be maintained out of the public revenues of the church; to enquire into the morals and converſation of the people, and to make their report thereof to the biſhop. Whence, on account of the variety of buſineſs, it was uſual to have ſeveral deacons in the ſame church.

In the romiſh church, it is the deacons office to incenſe the officiating prieſt or prelate; to lay the corporal on the altar; to receive the paten or cup from the ſub-deacon, and preſent them to the perſon officiating; to incenſe the choir; to receive the pax from the officiating prelate, and carry it to the ſub-deacon; and at the pontifical maſs, when the biſhop gives the bleſſing, to put the mitre on his head, and to take off the archbiſhop's pall, and lay it on the altar. In England, the form of ordaining deacons, declares that it is their office to aſſiſt the prieſt in the diſtribution of the holy communion; in which, agreeably to the practice of the antient church, they are confined to the adminiſtring the wine to the communicants. A deacon, with us, is not capable of any eccleſiaſtical promotion, yet he may be a chaplain to a family, curate to a beneficed clergyman, or lecturer to a pariſh church. He may be ordained at twenty-three years of age, *anno currente*; but it is expreſsly provided, that the biſhop ſhall not ordain the ſame perſon a prieſt and deacon in the ſame day. Deacons, according to St. Paul, ſhould be chaſte, ſincere, and blameleſs; neither great drinkers, nor given to filthy lucre; they ſhould hold the myſtery of the faith in a pure conſcience, and ſhould be well approved before they are admitted to the miniſtry.

DEACONESS, *a female deacon*, an order of women, who had their diſtinct offices and ſervices in the primitive church. This office appears as antient as the apoſtolical age; for St. Paul calls Phœbe a ſervant of the church of Cenchrea. The original word is διάκονος, anſwerable to the latin word *miniſtra*. Tertullian calls them *viduæ*, widows, becauſe they were commonly choſen out of the widows of the church; and for the ſame reaſon Epiphanius, and the council of Laodicea, calls them πρεσβυτίδας, elderly women, becauſe none but ſuch were ordinarily taken into this office. For, indeed, by ſome antient laws, theſe four qualifications were required in every one that was to be admitted into this order. 1. That ſhe ſhould be a widow. 2. That ſhe ſhould be a widow that had borne children. 3. A widow that was but once married. 4. One of a conſiderable age, forty, fifty, or ſixty years old. Tho' all theſe rules admitted of exceptions. Concerning their ordination, whether it was always performed by impoſition of hands, the learned are much divided in their ſentiments. Baronius and Valeſius think they were not, and make no other account of them than as mere lay-perſons. But the author of the conſtitutions, ſpeaking of their ordination, requires the biſhop to uſe impoſition of hands, with a form of prayer which is there recited. We are not, however, to imagine, that this ordination gave them any power to execute any part of the ſacerdotal office. They were only to perform ſome inferior ſervices of the church, and thoſe chiefly relating to the women for whoſe ſakes they were ordained. One part of their office was to aſſiſt the miniſter at the baptizing of women, to undreſs them for immerſion, and to dreſs them again, that the whole ceremony might be performed with all the decency becoming ſo ſacred an action. Another part of their office was to be private catechiſts to the women catechumens who were preparing for baptiſm. They were likewiſe to viſit and attend women that were ſick and in diſtreſs; to miniſter to the martyrs and confeſſors in priſon; to attend the womens gate in the church; and, laſtly, to aſſign all women their places in the church, regulate their behaviour, and preſide over the reſt of the widows, whence in ſome canons they are ſtiled προκαθημέναι, governeſſes. This order, which ſince the tenth or eleventh century has been wholly laid aſide, was not aboliſhed every where at once, but continued in the greek church longer than in the latin, and in ſome of the latin churches longer than in others.

DEACONRY, the order or miniſtry of the deacon or deaconeſs. See DEACON, &c.

DEACONRY, *diaconia*, is alſo the name of the chapels and oratories in Rome, under the direction of the ſeveral cardinal deacons in their reſpective quarters. Antiently, they were ſeven in number, as the deaconry of St. Maria in the broad way, the deaconry of St. Euſtachio near the Pantheon, &c. anſwering to the ſeven regions of the city. They had hoſpitals annexed to them for the diſtribution of alms, and an adminiſtrator for temporal concerns, called the father of the deaconry, who was ſometimes a prieſt and ſometimes a layman. At preſent, there are fourteen of theſe deaconries, or hoſpitals, under the direction of as many cardinals.

DEAD-MAN'S HEAD, in geography, a cape or promontory near Trigony in Cornwall, between St. Mawes and Fowey.

DEAD-MENS-EYES, in the ſea-language, a kind of blocks with many holes in them, but no ſheevers, whereby the ſhrouds are faſtened to the chains: the crow-feet reeve alſo through theſe holes; and, in ſome ſhips, the main-ſtays are ſet taught in them; but then they have only one hole, thro' which the lanyards are paſſed ſeveral times. See plate LXVII. fig. 5.

DEAD-NETTLE, a genus of plants called by botaniſts lamium. See LAMIUM.

DEAD-PLEDGE, the ſame with mortgage. See the article MORTGAGE.

DEAD-RECKONING, in navigation, the calculation made of a ſhip's place by means of the compaſs and log; the firſt ſerving to point out the courſe ſhe ſails on, and the other the diſtance run. From theſe two things given, the ſkilful mariner, making proper allowances for the variation of the compaſs, leeway, currents, &c. is enabled, without any obſervations of the ſun or ſtars, to aſcertain the ſhip's place tolerably well. See the articles COURSE, SAILING, COMPASS, CURRENT, LEE-WAY, &c.

DEAD-RISING, among ſailors, that part of a ſhip which lies aſt, between the keel and the floor-timbers, next adjoining to the ſtern-poſt, under the bread-room in a ſhip of war.

DEAD-ROPES, on board a ſhip, ſuch ropes as do not run in any block.

DEAD-SEA, in geography, a lake of Judea, into which the river Jordan diſcharges itſelf; being about ſeventy miles long, and twenty broad.

The water of this lake is both ſalt, and nauſeouſly bitter; and the bitumen it affords exactly reſembles pitch, from which it can only be diſtinguiſhed by its ſulphureous ſmell and taſte.

DEAD-TOPS, a diſeaſe incident to young trees, and cured by cutting off the dead parts cloſe to the next good twig or ſhoot, and claying them over as in grafting. See the article GRAFTING.

EAD-WATER, at ſea, the eddy-water juſt aſtern of a ſhip, ſo called, becauſe it does not paſs away ſo ſwift, as the water running by her ſides does. They ſay, that a ſhip makes much dead water, when ſhe has a great eddy following her ſtern.

DEADLY FEUD, in law, a profeſſion of an irreconcilable hatred, till a perſon is revenged even by the death of his adverſary. This enmity was allowed in the old ſaxon laws: for where any perſon was killed, if a pecuniary ſatisfaction was not made to the kindred of the ſlain, it was lawful for them to revenge themſelves, by arms, on the murderer.

EADLY-CARROT, a plant called by boaniſts thapſia. See THAPSIA.

ADLY-NIGHTSHADE, a name given to he belladonna of botaniſts. See the aricle BELLADONNA.

EADS, among miners, denotes the earth or other foſſile ſubſtances which incloſe the ore on every ſide. Hence, *breaking up the deads*, is the removing theſe ſubſtances for the conveniency of carrying on their work.

DEAFFORESTED, a term found in lawbooks, ſignifying that a place is diſcharged from being a foreſt, or freed from the foreſt-laws.

DEAFNESS, the ſtate of a perſon who either wants the ſenſe of hearing, or has it greatly impaired.

The cauſes of deafneſs are a cutting of the external ear, or an obſtruction of the auditory paſſage, from wax, or other things; from a rupture of the membrane of the tympanum; or when it is corroded, or ulcerated, or the auditory nerve is obſtructed or compreſſed. External cauſes, are falls from high places; exceſſive noiſe, ſuch as the exploſion of cannon; likewiſe acute diſeaſes near their ſtate, which are like to terminate by a critical hæmorrhage.

As to the prognoſtics, thoſe who are born deaf are rarely cured. A real deafneſs is hard to remedy. A deafneſs in acute diſeaſes, with crude urine, foretells a delirium: but when the ſigns of coction are good, it portends a critical hæmorrhage.

With regard to the cure, if the obſtruction be in the external cavity of the ear, it is diſcernible by the ſight. If there is occaſion to ſyringe the ear, a decoction of ſage and roſemary flowers will be proper, with equal parts of water and whitewine: but great caution ſhould be uſed. Some pump the head with warm bath waters: ſome ſay, the eggs of ants bruiſed, and put into the ear, with the juice of an onion, cures the moſt inveterate deafneſs. Others affirm, that a ſalivation will ſometimes perform a cure. A critical deafneſs will ceaſe of itſelf. Etmuller recommends amber and muſk; and hardneſs of hearing has been often cured by putting a grain or two of muſk into the ear with cotton.

Hoffman ſays, deafneſs ſometimes ariſes from a ſlackneſs of the auditory nerves, which often happens from too great a humidity, which, if neglected, will terminate in a perpetual and incurable deafneſs, and may be diſperſed, if taken in time, by proper cephalics and ſudorifics. Some, for this purpoſe, recommend equal parts of ſpirit of lavender and hungary-water, which ſhould be dropt warm into the ear. Lindanus adviſes the gall of an eel, mixt with ſpirit of wine; and others, the fumes of ſulphur conveyed into the ear with a pipe or funnel: but regard muſt always be had to the cauſe, if diſcoverable.

Heiſter informs us, that medicinal waters drank in the ſummer time pretty largely, are the beſt means as preſervatives, and for curing diſorders of the ears; and that they often perform more than any other remedies whatever.

Thoſe born deaf are alſo dumb, as not being able to learn any language, at leaſt in the common way: however, as the eyes, in ſome meaſure, ſerve them for ears, they may ſometimes underſtand what is ſaid, by obſerving the motion of the lips, tongue, *&c.* of the ſpeaker.

DEAL, a thin kind of fir-planks, of great uſe in carpentry: they are formed by ſawing the trunk of a tree into a great many longitudinal diviſions, of more or leſs thickneſs, according to the purpoſes they are intended to ſerve.

Deals are rendered much harder, by throwing them into ſalt-water as ſoon as they are ſawed, keeping them there three or four days, and afterwards drying them in the air or ſun; but neither this nor any other method yet known, will preſerve them from ſhrinking.

Deals called Burgendorp deals, the hundred containing ſix ſcore, pay on importation 3 l. 8 s. $8\frac{40}{100}$d. and draw back 3 l. 3 s. the rate 12 l. Meabro deals, ſix ſcore, pay 1 l. 2 s. $10\frac{80}{100}$d. and draw back 1 l. 1 s. the rate 4 l. Norway deals, ſix ſcore, pay 1 l. 8 s. $7\frac{1}{2}$d. and draw back 1 l. 6 s. 3 d. the rate 5 l. Spruce deals, ſix ſcore, pay 4 l. 5 s. $10\frac{1}{2}$ d. and draw back 3 l. 18 s. 9 d. the rate 15 l. Deals from Ruſſia, and all other countries not particularly rated, exceeding twenty feet in length, pay 4 l. 5 s. $10\frac{50}{100}$d. and draw back 3 l. 18 s. 9 d. the rate 15 l. Deals from Sweden, or any other country, of twenty feet in length or under, not otherwiſe rated, the 120, pay 1 l. 8 s. $7\frac{1}{2}$d. and draw back 1 l. 6 s. 3 d. the rate 5 l.

DEAL, in geography, a port town of the county of Kent, between which and the Goodwin-ſands, the ſhipping uſually rides in the Downs, in going out or coming home: it is about ſixty-ſeven miles eaſtward of London: eaſt long. 1° 30′, and north lat. 51° 16′.

DEAN, an eccleſiaſtical dignitary in cathedral and collegiate churches, and head of the chapter.

As there are two foundations of cathedral churches in England, the old and the new, ſo there are two ways of creating deans. Thoſe of the old foundation, founded before the ſuppreſſion of monaſteries, as the deans of St. Paul's, York, *&c.* are raiſed to that dignity much after the manner of biſhops, the king firſt ſending his congé d'elire, the chapter electing, and the king granting his royal aſſent, the biſhop confirms him, and gives his mandate to inſtall him. Thoſe of the new foundation, whoſe deanries were raiſed upon the ruins of priories and convents, ſuch as the deans of Canterbury, Durham, Ely, Norwich, Wincheſter, *&c.* are donative, and inſtalled by virtue of the king's letters patent, without either election or confirmation. Canoniſts diſtinguiſh between deans of cathedral and thoſe of collegiate churches. The firſt, with their chapter, are regularly ſubject to the juriſdiction of the biſhop. As to the latter, they have uſually the contentious juriſdiction in themſelves, though ſometimes this belongs to them in common with the chapter. There are cathedral churches which never had a dean, and in which the biſhop is head of the chapter, and in his abſence, the archdeacon: ſuch are the cathedrals of St. David and Landaff. There are alſo deans without a chapter, as the dean of Battle in Suſſex, dean of the arches, *&c.* and deans without a juriſdiction, as the dean of the chapel royal. In this ſenſe the word is applied to the chief of certain peculiar churches or chapels.

Rural **DEAN**, called alſo archpreſbyter, originally exerciſed juriſdiction over ten churches in the country, and afterwards became only the biſhop's ſubſtitute, to grant letters of adminiſtration, probate of wills, *&c.* to convocate the clergy, and ſignify to them ſometimes by letters, the biſhop's will, and to give induction for the archdeacon. Their office is now loſt in that of the archdeacons and chancellors.

DEAN *of a monaſtery*, was a ſuperior eſtabliſhed under the abbot, to eaſe him in taking care of ten monks, whence he was called decanus.

DEAN and CHAPTER, are the biſhop's council to aſſiſt him in the affairs of religion, and to aſſent to every grant which the biſhop ſhall make to bind his ſucceſſors. As a deanry is a ſpiritual dignity, a man cannot be a dean and prebendary of the ſame church.

DEAN, in geography, the name of a foreſt in Glouceſterſhire, lying northward of the river Severn.

DEARTICULATION, the ſame with diarthroſis. See DIARTHROSIS.

DEATH, *mors*, is generally conſidered as the ſeparation of the ſoul from the body; in which ſenſe it ſtands oppoſed to life, which conſiſts in the union thereof. Phyſicians teach, that as the life of thoſe animals we call perfect conſiſts in a continued flux and reflux of the blood, nervous juice and air, to and from the principal organs, ſo a man may be reckoned dead when he no longer breathes, and his heart and arteries have left off all circulation and pulſation. But Dr. Stevenſon, as we find in the Medical Eſſays, does not admit this doctrine, being of opinion, that after the motion of the heart, arteries, and lungs ceaſes, there often remains a ſmall degree of vital principle deſerving attention. He then propoſes a theory of his own, in conſequence of which it ſeems, that death does not inevitably attend an intire organic reſt of what we call the ſolids of the body; nay, that one cannot be called dead, till the energy of the blood is ſo far gone, that, though aſſiſted by all poſſible means, it can never be again able to fill and ſtimulate into contraction the right ſinus venoſus, and auricle of the heart.

Men, ſays lord Bacon, fear death as children fear the dark; and as that natural fear in children is increaſed by frightful tales, ſo is the other. Groans, convulſions, weeping friends and the like, ſhew death terrible; yet there is no paſſion ſo weak but conquers the fear of it, and therefore death is not ſuch a terrible enemy. Revenge triumphs over death, love ſlights it, honour aſpires to it, dread of ſhame prefers it, grief flies to it, and fear anticipates it. The ſame noble author thinks it the office of a phyſician to procure eaſy deaths, as well as to reſtore health.

In law, there is a natural death and a civil death: natural, where nature itſelf expires; civil, where a perſon is not actually dead, but adjudged ſo by law. Thus, if any perſon, for whoſe life an eſtate is granted, remains beyond ſea, or is otherwiſe abſent ſeven years, and no proof made of his being living, he ſhall be accounted naturally dead.

DEATH-WATCH, in zoology, an inſect nearly of the ſize of the common louſe, frequent among old wood, furniture, &c. It is of an oblong and flattiſh figure, and of a pale browniſh-white colour; and the noiſe, reſembling the beating of a watch, is the love-note of theſe animals, when the male or female woo each other.

DE BENE ESSE', a latin phraſe uſed in our law in a doubtful meaning, as to take or do a thing *de bene eſſé*, is to allow it at preſent to be well done; but when it comes to be more fully examined, then to ſtand or fall according to the merit of the thing. In the chancery, upon a motion for one of the defendants of a ſuit to be examined, the court frequently orders it to be done *de bene eſſé*, viz. that his depoſition ſhall be taken, and allowed or ſuppreſſed at the hearing of the cauſe upon the full debate of the matter as the court ſhall think fit. Alſo where a complainant's witneſſes are ſick or aged, or going beyond ſea, ſo that he is in danger of loſing their evidence, the court of chancery will order them to be examined *de bene eſſé*, in which caſe they are valid, if the plaintiff has not an opportunity of examining them afterwards.

DEBENHAM, a market town of Suffolk, about twenty miles eaſt of Bury: eaſt longitude 1° 20', and north latitude 52° 20'.

DEBENTURE, a term of trade uſed at the cuſtom-houſe for a kind of certificate ſigned by the officers of the cuſtoms, which entitles a merchant exporting goods to the receipt of a bounty or drawback. All merchandiſes that are deſigned to be taken on board for that voyage being entered and ſhipped, and the ſhip being regularly cleared out, and ſailed out of port on her intended voyage, debentures may be made out from the exporter's entries, in order to obtain the drawbacks, allowances, bounties or premiums; which debentures for foreign goods, are to be paid within one month after demand. And in making out theſe debentures, it muſt be obſerved, that every piece of vellum, parchment, or paper, containing any debenture for drawing back cuſtoms or duties, muſt, before writing, be ſtamped, and pay a duty of eight-pence.

The form of debentures vary, according to the merchandiſe exported. In the execution of debentures for tobacco, it muſt be particularly obſerved, 1. That debentures for the ſame quantity, may be made in one or more parchments. 2. That the exporter's oath muſt be printed, ſpecifying whether he acts for himſelf or by commiſſion. If exported to any other foreign ports than thoſe of Ireland, the word Ireland muſt be added to the oath after Great Britain. 4. That as no tobacco may be conſumed on board ſhips of war in Europe, but what has paid full duties, and been manufactured in Great Britain, no drawback is to be allowed for tobacco exported in any man of war. 5. That the eight pounds *per* hogſhead of 350 pounds, or more, allowed for draught at importation, muſt not be deducted on exportation. 6. That debentures for tobacco exported to Ireland, muſt not be paid till a certificate be produced, teſtifying the landing thereof. 7. That no perſons may ſwear to the exportation, but ſuch as are permitted to ſwear to debentures for other goods. In debentures for all other foreign goods, no perſon may be admitted to ſwear to the exportation, but the true exporter, either as a proprietor, or, who being employed by commiſſion, is concerned in the direction of the voyage. All kinds of debentures before delivered or paid to the exporters, are entered into a ſeparate book kept for that purpoſe by the collector and comptroller of the cuſtoms. See the article BOUNTY.

DEBENTURE, in ſome of the acts of parliament, denotes a kind of bond or bill firſt given in 1649, whereby the government is charged to pay the ſoldier creditor, or his aſſigns, the money due on auditing the account of his arrears.

DEBENTURE is likewiſe uſed in the exchequer, and given to the king's ſervants for the payment of their wages.

DEBET, among merchants, ſignifies the ſums due to them for goods ſold on credit, for which they have charged their journal or ledger. It is more particularly underſtood of the remainder of debts, part of which has been paid on account.

DEBET, among book-keepers, is uſed to expreſs the left-hand page of the ledger, to which are carried all articles ſupplied or paid, on the ſubject of an account.

DEBET and **SOLET**, in law, are formal words uſed in divers writs, ſometimes both together, and ſometimes only debet. As if a perſon by writ ſues to recover any right whereof his anceſtor was diſſeized, then he uſes the word debet alone: but where he ſues for any thing that is now firſt of all denied him, in that caſe he uſes debet and ſolet.

DEBET & DETINET, *he owes and detains*, in law, are terms uſed in bringing of actions. Debt againſt an heir, muſt be in the debet and detinet; but againſt executors, for money due in the time of the teſtator, the action ought to be in the detinet.

DEBILITY, among phyſicians, a relaxation of the ſolids, occaſioning oftentimes weakneſſes and faintings.

DEBRECHEN, a town of upper Hungary, about ſeventy-ſeven miles eaſt of Buda: eaſt longitude, 21° 10′, and north latitude 47° 45′.

DEBRUIZED, in heraldry, a term peculiar to the Engliſh, by which is intimated the grievous reſtraint of any animal, debarred of its natural freedom, by any of the ordinaries being laid over it.

DEBT, *debitum*, in law, any thing due to another, whether it be money, goods, or ſervices; or, the action brought for recovering the ſame.

Where money is due upon any ſpeciality, an action of debt, and no other, lies. On a bond, debt may be brought againſt the obligor or his heir, who has lands by deſcent, if the executors have not ſufficient to pay it; and an heir mediate may be ſued for debt, as if he were an immediate heir. If a perſon acknowledges, by deed, that he has ſo much of another's money in his hands, here the action of debt will lie for it; and where one owes a ſum of money to another, who hath his note under hand, without a ſeal, action of debt on a mutuatus lies. Debt lies alſo on a recognizance; ſo upon a ſtatute merchant, which is in nature of a bond, or obligation: but it is ſaid to be otherwiſe, in caſe of a ſtatute ſtaple.

Whether an action of debt be brought on a bill, bond, leaſe, *&c.* the ſeveral writings are to be well conſidered, by which the plaintiff warrants his action, and the ſum due muſt be rightly ſet forth: thus, if it be for rent, the time of commencement and ending muſt be ſpecified; and the judgment, where the demand is in the debet and detinet, is to recover the debt, damages, and coſts of ſuit. But in a debt on a ſingle bill, a defendant may plead payment, before the action brought in bar; and, on bond, he may bring in the principal, intereſt, and coſts pending the action, and thereupon be diſcharged.

DEBT *to the king*, comprehends in it all rents, iſſues, amerciaments, and other things due to the king, whoſe debts are preferred before thoſe of a ſubject; and until his debt is ſatisfied, he may protect the debtor from the arreſts of others. Pledges ſhall not be diſtrained for theſe debts, where the principal is ſufficient.

DEBTOR, a perſon who owes any thing to another, in contradiſtinction to creditor, which is he to whom the debt is owing.

Where debt is a ſimple contract, it follows the perſon of the debtor, and, it is ſaid, not of the creditor, as to actions brought, *&c.*

There have been divers ſtatutes diſcharging debtors out of priſon, when they had no effects to pay their creditors. See the article PRISONER.

DEBTOR, in merchants accounts. See the article BOOK-KEEPING.

DECACHORDON, in antiquity, a muſical inſtrument with ten ſtrings, called by the Hebrews haſur, being almoſt the ſame as our harp, of a triangular figure, with an hollow belly, and ſounding from the lower part.

DECAGON, in geometry, a plane figure with ten ſides and ten angles: it is called a regular decagon, when all the ſides and angles are equal.

If we ſuppoſe the radius of a circle to be r, then will $\sqrt{\frac{5}{4}r^2}-\frac{1}{2}r$, or $\sqrt{\frac{5-1}{2}}+r$, be the ſide of a decagon inſcribed in that circle. Again, ſuppoſing the ſide of a decagon to be 1, the area thereof will be 8.69; whence as 1 to 8.69, ſo is the ſquare of the ſide of any given decagon to the area of that decagon.

DECALOGUE, δεκαλογος, the ten precepts or commandments delivered by God to Moſes, after engraving them on two tables of ſtone.

There are ſeveral refined ſpeculations concerning the promulgation of thoſe divine laws, as whether they were delivered by an angel, deputed by God for that purpoſe, or by the deity himſelf; and, if by the latter, whether it was the firſt or ſecond perſon of the godhead that took upon him to be the legiſlator of the Jews: but theſe are debates of ſuch a nature, that nothing can be concluded about them. The Jews, by way of excellence, call theſe commandments the *ten words*, from whence they had afterwards the name of decalogue: but it is to be obſerved, that they joined the firſt and ſecond into one, and divided the laſt into two: they underſtand that againſt ſtealing, to relate to the ſtealing of men, or kidnapping; alleging, that the ſtealing one anothers goods or property, is forbidden in the laſt commandment.

The Talmudiſts, and after them Poſtellus, pretended that the decalogue was written, or engraved, in letters of light, *i. e.* luminous, ſhining letters, and that the engraving went quite thro' the tables. The emperor Julian objected to the decalogue, that the precepts it contained (thoſe only excepted which concern the worſhip of falſe gods, and the obſervation of the ſabbath) were already ſo familiar to all nations, and ſo univerſally received, that they were unworthy, for that very reaſon, to be delivered, by ſo great a legiſlator, to ſo peculiar a people. The church of Rome has ſtruck the ſecond commandment quite out of the decalogue, and to make their number complete, hath ſplit the tenth into two. The reaſon of which may be eaſily conceived.

DECAMERIS, a term uſed by ſome writers upon ſound, to denote a tenth part. See the article SOUND.

DECAMERON, a work containing the actions or converſations of ten days. Boccacio's Decameron conſiſts of one hundred novels, related in ten days.

DECAMPING, in military affairs, is the marching of an army from the ground where it before lay encamped. See CAMP.

DECAN, a province of the hither India, bounded by the province of Cambaya, or Guzurat, on the north; by Golconda and Berar, on the eaſt; by Viſapour, on the ſouth; and by the Indian ocean on the weſt. Its chief inland town is Aurengabad, and upon the coaſt the town of Bombay.

DECANDRIA, in the linnæan ſyſtem of botany, a claſs of plants, the great characteriſtic of which is, that they have hermaphrodite flowers, with ten ſtamina in each. See BOTANY, STAMINA, *&c.*

DECANTATION, among chemiſts, *&c.* the gently pouring off a liquor from its fæces, by inclining the lip or canthus of the veſſel; whence the name.

The deſign of this operation, is in order to have the liquor free from the ſediment, which, upon ſtanding, it lets fall to the bottom of the veſſel.

DECANUS, in roman antiquity, an officer who preſided over ten other officers, and was head of the contubernium, or ſerjeant of a file of ſoldiers.

DECAPITÉ, or DEFFAIT, in heraldry. See the article DEFFAIT.

DECAPROTI, *decemprimi*, in roman antiquity, officers for gathering the tributes and taxes.

The decaproti were alſo obliged to pay for the dead, or to anſwer to the emperor for the quota parts of ſuch as died, out of their own eſtates.

DECASTYLE, in the antient architecture, a building with an ordonnance of ten columns in front, as the temple of Jupiter Olympius was.

DECEIT, *dolus*, in law, a ſubtile trick, or device, to which may be added all manner of craft and colluſion, or underhand practice, uſed to defraud another, by any means whatever.

Deceit is an offence both by common law and by ſtatute. All practices of defrauding, or endeavouring to defraud, another of his right, are puniſhable by fine and impriſonment, and ſometimes pillory, *&c.* and there is a writ called *deceptione*, that lies for one who receives injury or damage, *&c.*

A writ of deceit lies againſt attornies, for loſſes ſuſtained by their default; alſo againſt bakers, brewers, and other artificers, for not ſelling good commodities, or refuſing to perform a bargain: in all which caſes, they are, by ſtatute, liable to penalties in proportion to their offence.

DECEIVED, in the manege: a horſe is ſaid to be deceived, upon a demivault of one or two treads, when working, for inſtance, to the right, and not having yet finiſhed above half the demivault, he is preſſed one time or motion forwards, with the inner leg, and then is put to a reprize upon the left, in the ſame cadence with which he began; and thus he regains the place where the demivault had been begun to the right, and works to the left: thus a horſe may be deceived upon any hand.

DECEMBER, in chronology, the laſt month of the year, conſiſting of thirty-one days, and ſo called as being the tenth month in the roman year, which commenced with March. See the articles YEAR and MONTH.

DECEMPEDA, δεκάπους, in antiquity, a rule or rod divided into ten feet, each of which was ſubdivided into inches, and thoſe into digits, uſed in meaſuring of land, and, by architects, in giving the proper dimenſions and proportions to the parts of their buildings.

DECEM TALES, in law, a writ that iſſues directed to the ſheriff, whereby he is commanded to make a ſupply of jury-men, where a full jury does not appear on a trial at bar.

DECEMVIRI, in roman antiquity, ten magiſtrates choſen annually at Rome, to govern the commonwealth inſtead of conſuls, with an abſolute power to draw up and make laws for the people.

One of the decemviri had all the enſigns and honours of the function, and the reſt had the like in their turn, during the year of their decemvirate. In them was veſted all the legiſlative authority ever enjoyed by the kings, or, after them, by the conſuls. It was the decemviri drew up the laws of the Twelve Tables, thence called *leges decemvirales*, which were the whole of the roman law, for a conſiderable time.

There were alſo other decemviri, created on frequent emergencies, to manage and regulate certain affairs, as conducting colonies, preſiding at feaſts, taking care of ſacrifices, keeping the ſibyls books, *&c.*

DECENNALIA, antient roman feſtivals celebrated by the emperors, every tenth year of their reign, with ſacrifices, games, and largeſſes for the people. The emperor Auguſtus firſt inſtituted theſe ſolemnities, in which he was imitated by his ſucceſſors: at the ſame time the people offered up vows for the emperor, and for the perpetuity of the empire, which were therefore called *vota decennalia*. Auguſtus's view in eſtabliſhing the decennalia was to preſerve the empire and the ſovereign power without offence or reſtraint to the people.

DECENNARY, in our old law-books, denotes the precinct or diſtrict of ten friburghs. See the next article.

DECENNIERS, DECINERS, or DOZINERS, in our antient law, ſuch as had the overſight of ten friburghs, for the maintenance of the king's peace, the limits of whoſe juriſdiction was called decenna.

Theſe ſeem to have had a great authority in the time of the Saxons, taking cognizance of cauſes within their circuits, and redreſſing wrongs, by way of judgment. In later times, the word came to ſignify ſuch a perſon as by oath of loyalty to his prince, was ſettled in the combination or ſociety of ſuch a dozein.

DECEPTIONE, in law, a writ which lies in caſes of deceit. See DECEIT.

DECIDUOUS, an appellation chiefly uſed in reſpect to plants: thus, the calyx or cup of a flower is ſaid to be deciduous, when it falls along with the flower-petals; and, on the contrary, it is called permanent, when it remains after they are fallen. Again, deciduous leaves are thoſe which fall in autumn, in contradiſtinction to thoſe of the ever-greens, which remain all the winter.

DECIES TANTUM, in law, a writ that lies againſt a juror, for having taken money of either party in a ſuit, on account of giving his verdict.

This writ is ſo called becauſe it recovers ten times as much as he took. Any perſon, though not a party in the ſuit, may bring this writ in the name of the king and himſelf, and recover the like; one half to the crown, and the other to the informer or proſecutor, which action the king may not releaſe by pardon, after it is commenced.

DECIL, in aſtronomy, an aſpect or poſition of two planets, when they are diſtant from each other a tenth part of the zodiac.

DECIMAL ARITHMETIC, the art of computing by decimal fractions.

DECIMAL FRACTION, that whoſe denominator is always 1, with one or more cyphers: thus, an unit may be imagined to be equally divided into 10 parts, and each of theſe into 10 more; ſo that by a continual decimal ſubdiviſion the unit may be ſuppoſed to be divided into 10, 100, 1000, *&c.* equal parts, called tenth, hundredth, thouſandth parts of an unit.

In decimal fractions, the figures of the numerator are only expreſſed, the denominator being omitted, becauſe it is known to be always an unit with ſo many cyphers as there are places in the numerator. A decimal fraction is diſtinguiſhed from an integer with a point prefixed, as .2 for $\frac{2}{10}$, .34 for $\frac{34}{100}$, .567 for $\frac{567}{1000}$, *&c.* The ſame is obſerved in mixed numbers, as 678.9 for $678\frac{0}{10}$, 67.89 for $67\frac{80}{100}$, 6.789 for $6\frac{789}{1000}$, *&c.*

Cyphers at the right hand of a decimal fraction alter not its value; for .5 or .50 or .5000 is each of them of the ſame value, equal to $\frac{5}{10}$, or $\frac{1}{2}$: but cyphers at the left hand, in a decimal fraction, decreaſe the value in a tenfold proportion; for .05 is $\frac{5}{100}$, .005 is $\frac{5}{1000}$, .0005 is $\frac{5}{10000}$, *&c.*

Decimal fractions are eaſily reduced into a common denominator, by making, or even ſuppoſing, all of them to conſiſt of the ſame number of places; ſo .3, .45, .067, .0089, may be written thus, .3000 .4500, .0670, .0089; all which conſiſting of four places, their common denominator is an unit with four cyphers, namely 10000.

Addition and ſubtraction of decimals are the ſame as in whole numbers, when the places of the ſame denomination are ſet under one another, as in the following examples:

To	34.25	From	16.5
Add	3.026	Subtract	.125
Sum	37.276	Rem.	16.375

In multiplication the work is the ſame as in whole numbers, only in the product, ſeparate, with a point, ſo many figures to the right hand as there are fractional places both in the multiplicand and multiplier; then all the figures on the left hand of the point make the whole number, and thoſe on the right a decimal fraction.

It is to be noted, that if there be not ſo many figures in the product, as ought to be ſeparated by the preceding rule, then place cyphers at the left, to complete the number, as may be ſeen in Example V.

Ex. I. Mult.	456		Ex. II. Mult.	45.6
by	21.3		by	21.3
	1368		Product	971.28
	456			
	912			
Product	9712.8			

Examp. III. Multiply	456
by	0.213
Product	97.128
Example IV. Multiply	45.6
by	0.213
Product	9.7128
Ex. V. Multiply	0.0456
by	0.213
Product	0.0097128

In diviſion the work is the ſame as in whole numbers, only in the quotient, ſeparate, with a point, ſo many figures to the right hand for a decimal fraction, as there are fractional places in the dividend, more than in the diviſor, becauſe there muſt be ſo many fractional places in the diviſor and quotient together, as there are in the dividend.

As diviſion of decimal fractions is extremely difficult, eſpecially with regard to the value of the figures of the quotient, we ſhall here give a general rule for aſcertaining their values, *viz.*

Rule, place the firſt multiple of the diviſor under the dividend, as in operations of common diviſion; then will the unit's place of this multiple ſtand under ſuch a place of the dividend, as the firſt ſignificant figure of the quotient is to be; that is, the firſt ſignificant figure of the quotient will be of the ſame name, or value, with the figure of the dividend which ſtands above the unit's place of the multiple.

This rule will hold in all caſes. 1. When the number of decimals are equal in the diviſor and dividend, the quotient will be integers, or whole numbers: for placing the firſt multiple of the diviſor under the dividend, according to the rule, (Exam. I.) the unit's place 5, is found to ſtand under 9, the place of tens in the dividend; ſo that 3, the firſt figure of the quotient, muſt be tens alſo, and 5, the next figure, units.

Example I.

8.45)295.75(35
25.35
4225
4225

2. When the number of decimals in the dividend, exceed thoſe in the diviſor, as in Example II. where 2, the unit's place of the multiple of the diviſor, ſtands under 8, the place of tens of the dividend; whence 3, the firſt figure of the quotient, muſt be tens alſo; and 2, the next figure, units; ſo that the remaining figures, 12, muſt be decimals.

Example II.

24.3)780.516(32.12
72.9

This is done, more ſhortly, by making as many figures of the quotient decimals, as there are more decimal places in the dividend than in the diviſor. 3. When there are not ſo many decimal places in the dividend, as there are in the diviſor, cyphers muſt be added to the right hand of the dividend, to make them equal: thus, to divide 192.1 by 7.684, as in Example III. add two cyphers, to make the decimals equal; and, by the above rule, the quotient 25 will be found to be integers, as 5, the place of units, ſtands under 9, the place of tens.

Example III.

7.684)192,100(25
15.368
38420
38420

4. If after diviſion there are not ſo many figures in the quotient as there ought to be decimal parts, ſupply this defect by prefixing cyphers to the quotient found: thus, in Example IV. the quotient by diviſion is found to be 758; and, by the above rule, the firſt figure, 7, ought to ſtand in the decimal place of thouſandths, which it is made to do by prefixing two cyphers.

Example IV.

957)7.25406(.00758
6699

Vulgar fractions are reduced to decimals of the ſame value, by dividing the numerator by the denominator.

Thus, $\frac{1}{2}=\frac{1.0}{2}=.5$, and $\frac{3}{4}=\frac{3.00}{4}=.75$, and $\frac{2}{7}=\frac{2.000000,\&c.}{7}=.285714$, nearly.

Decimal scales are thoſe which are decimally divided.

DECIMATION, a puniſhment inflicted by the Romans on ſuch ſoldiers as quitted their poſt, or behaved themſelves cowardly in the field. The names of all the guilty were put into an urn or helmet, and as many were drawn out as made the tenth part of the whole number, and theſe were put to the ſword, and the others ſaved.

DECIPHERING, the art of finding the alphabet of a cipher. See Cipher.

Every language has, beſides the form of its characters, ſomething peculiar in the place, order, combination, frequency, and number of the letters; to all which particular regard is to be had in deciphering. In all languages, however, the following rules ought to be obſerved: 1. One word is to be compared with another, that their reſemblance and difference may be known. 2. No word can be without a vowel. 3. A word of one letter is always a vowel, or a conſonant with an apoſtrophe. 4. The vowels recur much more frequently than the conſonants. 5. Double vowels may be at the beginning of a word, but not double conſonants. 6. Double characters at the beginning of a word are always vowels. 7. Short words of two or three letters have two or three, or one or two conſonants. 8. The vowels are therefore moſt eaſily learned from the ſhort words which are to be firſt conſidered by the decipherer. 9. If double characters are preceded by a ſingle letter, the letter is a vowel. 10. In languages abounding with diphthongs one vowel is often joined with another. 11. The letter that precedes or follows double conſonants, is, if a conſonant, always one of the liquids, *l*, *m*, *n*, *r*. 12. If two different characters occur, of which the latter is often conjoined with various letters, and the former is never found either by itſelf, or followed by any other letter, thoſe two are *qu*. 13. Theſe letters *qu* are always followed by a vowel. 14. One vowel recurs more frequently than another, as do the conſonants, according to the language, *&c.*

DECISE, a town of the Orleanois, in France, ſituated on the river Loire, about fifteen miles ſouth-eaſt of Nevers: eaſt long. 3° 32′, and north lat. 46° 40′.

DECK *of a ſhip* is a planked floor from ſtem to ſtern, upon which the guns lie, and where the men walk to and fro.

Great ſhips have three decks, firſt, ſecond, and third, beginning to count from the lowermoſt.

Half deck reaches from the main-maſt to the ſtem of the ſhip.

Quarter-deck is that aloft the ſteerage, reaching to the round-houſe.

Fluſh-deck is that which lies even in a right line fore and aft, from ſtem to ſtern.

A rope-deck is that made of cordages, interwoven and ſtretched over a veſſel, thro' which it is eaſy to annoy an enemy, who comes to board her. They are little uſed but by ſmall veſſels, to defend them from privateers.

DECKENDORF, a town of Bavaria, in Germany, ſituated on the Danube, about thirty-ſeven miles ſouth-eaſt of Ratiſbon: eaſt longitude 13°, and north latitude 48° 45′.

DECLAMATION, a ſpeech made in public, in the tone and manner of an oration, uniting the expreſſion of action to the propriety of pronunciation, in order to give the ſentiment its full impreſſion upon the mind.

Among the Greeks, declamation was the art of ſpeaking indifferently on all ſubjects, and on all ſides of a queſtion. With us it is reſtrained to certain exerciſes which ſcholars perform, to teach them to ſpeak in public.

DECLARATION, in law, is a formal ſhewing in writing the ground of complaint of the plaintiff, in an action againſt the defendant, where the plaintiff is ſuppoſed to have received ſome injury. This declaration ought to be plain and certain, becauſe it impeaches the defendant and obliges him to anſwer thereto. It is alſo an expoſition of the writ, with the addition of time, circumſtances, *&c.* and muſt be true as well as clear, for the court will not take things in it by implication: and it ſets forth the names both of the plaintiff and defendant, the nature and cauſe of the action, *&c.* and the damage received.

Declaration, in an action real, is termed a count. See the article COUNT.

DECLARATION in alſo uſed for a confeſſion which the quakers are obliged to make and ſubſcribe, inſtead of the oaths of ſupremacy, *&c.* See AFFIRMATION.

DECLARATION, a term of the cuſtom-houſe, and of commerce in France, contains a particular account or invoice of what is contained in the bales, *&c.* brought to the offices for entrance inward or outward.

DECLENSION, in grammar, an inflexion of nouns according to their divers caſes, as nominative, genitive, dative, *&c.* It is a different thing in the modern languages, which have not properly any caſes, from what it is in the antient greek and latin. With reſpect to languages, where the nouns admit of changes, either in the beginning, the middle, or ending, declenſion is properly the expreſſion of all thoſe changes in a certain order, and by certain degrees called caſes. With regard to languages, where the nouns do not admit of changes in the ſame number, declenſion is the expreſſion of the different ſtates a noun is in, and the different relations it has; which difference of relations is marked by particles, and called articles, as *a*, *the*, *of*, *to*, *from*, *by*, &c. See ARTICLE.

DECLENSION of a diſeaſe is when it is paſt its height.

DECLINATION, in aſtronomy, the diſtance of any celeſtial object from the equinoctial, either northward or ſouthward. It is either true or apparent, according as the real or apparent place of the object is conſidered.

The declination being an arch of a ſecondary of the equinoctial intercepted between a given point and the equinoctial, and perpendicular to the ſame, the declination of a ſtar, *&c.* is found in the following manner. Firſt obſerve the altitude of the pole; as P R (plate LXVII. fig. 6.) this ſubtracted from 90°, gives the height of the equator A H; then the meridian altitude of the ſtar H D being obſerved, if it be greater than the altitude of the equator A H, the latter ſubtracted from the former, leaves the declination northward A D: or if the altitude of the ſtar H T be leſs than that of the equator A H, the former ſubtracted from the latter, leaves the declination ſouthward T A. If the ſtar be in the quadrant Z R, then the leaſt altitude M R, ſubtracted from the altitude of the pole P R, leaves the diſtance from the pole P M; which ſubtracted again from the quadrant P Q, leaves the declination M Q.

By this method are conſtructed the tables of declination of the fixed ſtars, given us by Ricciolus and Dechales.

To find the ſun's or ſtar's declination by the globe, bring the ſun's place, or the ſtar, to the meridian, and the degrees from the equinoctial there reckoned, either north or ſouth, are the declination at noon.

The greateſt declination of the ſun, or of the ecliptic, is commonly computed 23° 30′. See ECLIPTIC.

Circle of DECLINATION. See the article CIRCLE.

Refraction of the DECLINATION. See the article REFRACTION.

DECLINATION *of the ſea-compaſs*, or *needle*, is its variation from the true meridian of any place. See VARIATION.

DECLINATION *of a wall or plane for dials* is an arch of the horizon, contained either between the plane and the prime vertical circle, if you reckon it from the eaſt or weſt; or elſe between the meridian and the plane, if you account it from north or ſouth. There are many ways given by authors for finding the declination of a plane, of which all thoſe that depend upon the magnetic needle deſerve to be ſuſpected on many accounts. The common method, by finding the ſun's horizontal diſtance from the pole of the plane, is ſubject to many errors and difficulties. The way therefore we would recommend as the beſt for finding the declination of a plane, is by a declinator. See the next article.

DECLINATOR, or DECLINATORY, an inſtrument contrived for taking the declinations, inclinations, and reclinations of planes. It is conſtructed in the following manner: on a ſquare wooden board, A B C D (plate LXVII. fig. 7. n° 1.) deſcribe a ſemicircle A E D, and divide the two quadrants A E and E D into 90°, each beginning from E, as in the figure: then having fixed a pin in the center F, fit a ruler H I upon the ſame, moveable thereon, with a box and needle K (*ibid.* n° 2.) In order to take the declination of a plane, apply the ſide A D to the plane propoſed, as M N (*ibid.* n° 3.) and move the ruler F G, with the compaſs G, about the center F, till the needle reſt upon the line of the magnetical meridian of the place: if the ruler cut the quadrant in E, the plane is either directly northern or ſouthern; but if it cut between D and E, the plane declines to the weſt; and if between A and E, to the eaſt, by the quantity of the angle G F E.

Would you take the inclinations and reclinations of planes with this inſtrument, inſtead of the ruler and needle, a thread with a plummet is fitted on a pin in the center F; then the ſide B C of the declinator A B C D (*ibid.* n° 4.) being applied to the propoſed plane, as I L, if the plum-line F G cut the ſemicircle A E D in the point E, the plane is horizontal; or if it cut the quadrant E D, in any point at G, then will E F G be the angle of inclination: laſtly, if applying the ſide A B to the plane, the plummet cut E, the plane is vertical. Hence if the quantity of the angle of inclination be compared with the elevation of the pole and equator, it is eaſily known whether the plane be inclined or reclined. See INCLINATION and RECLINATION.

DECLINING DIALS, thoſe which do not face directly any of the four cardinal points. See the article DIAL.

DECLIVIS, in anatomy, a muſcle otherwiſe called obliquus deſcendens. See the article OBLIQUUS.

DECLIVITY denotes juſt the reverſe of acclivity. See ACCLIVITY.

DECOCTION, in pharmacy, the boiling ſimples, or other drugs, in order to extract their virtues for ſome medicinal purpoſe. The general ſubjects of decoction are animals and vegetables, and ſometimes minerals, as antimony and quickſilver. The liquors which ſerve to boil them, are water, wine, vinegar, milk, and whey.

Decoction is moſtly employed about balſamics, detergents, and cathartics; for it is not ſo proper for cephalics, &c. becauſe it exhales the more volatile parts, in which the virtues of all thoſe ingredients conſiſt. The harder bodies, as woods, dried roots, &c. require moſt boiling; but herbs and ſeeds need only be ſcalded. All thoſe decoctions which are reſtringent, and moſt of the cathartics, may, for greater elegance, be clarified; but all ſuch as are emollient, and intended to conſiſt of the ſoft and mucilaginous parts of ſimples, are by no means to be ſo managed.

DECOLLATION, beheading, a term frequently uſed in the phraſe, *decollation of St. John Baptiſt*, which denotes a painting repreſenting the Baptiſt's head ſtruck off from the body.

DECOMPOSITE LEAF, one whoſe petiole is twice divided before it gives riſe to the leaf.

DECOMPOSITION, in chemiſtry and pharmacy, the reduction of a body into its principles or component parts. See the article ANALYSIS.

DECORATION, in architecture, is uſed for whatever adorns a building, either withoutſide or within. The orders of architecture contribute a great deal to the decoration; but then the ſeveral parts of thoſe orders muſt have their juſt proportion, characters and ornaments, otherwiſe the fineſt order will bring confuſion rather than richneſs. See CORINTHIAN, COMPOSITE, *&c.* ORDERS.

Decorations, in churches, are paintings, feſtoons, vaſes, *&c.* occaſionally applied to the walls, but with ſuch diſcretion as not to deſtroy the form and beauty of the architecture, as is practiſed in Italy at the ſolemn feaſts. See the article FESTOON, VASE, *&c.*

DECORATION alſo ſignifies the ſcenes of theatres. See the article SCENE.

In operas and other theatrical performances, they muſt be often changed, in conformity to the ſubject.

DECORTICATION, the ſame with barking of trees. See BARKING.

DECORUM, in architecture, is the ſuitableneſs of a building, and the ſeveral parts and ornaments thereof, to the ſtation and occaſion.

Vitruvius is very exact in this point, and gives rules expreſly for the appropriating the ſeveral orders to their natural characters.

Decorum is uſed by ſome to ſignify the obſerving a due reſpect between the inhabitant and habitation. Whence Palladio concludes that the principal entrance muſt never be regulated by any certain dimenſions, but according to the dignity of the perſon who is to live in it.

DECOUPLE', in heraldry, the ſame as uncoupled: thus, a chevron decouplé, is a chevron wanting ſo much of it towards the point, that the two ends ſtand at a diſtance from one another, being parted and uncoupled.

DECOURS, in heraldry, the ſame with decrement. See DECREMENT.

DECOY, a place made for catching wildfowl. Hence,

DECOY-DUCK is a duck that flies abroad, and lights into company of wild ones, which by her allurements ſhe draws into the decoy.

DECREE, an order made by a ſuperior power, for the regulation of an inferior.

DECREE, in the civil law, is a determination that the emperor pronounces upon hearing a particular cauſe between plaintiff and defendant.

DECREES *of councils* are the laws made by them, to regulate the doctrine and policy of the church.

DECREES *in chancery*, are the determinations of the lord chancellor, upon a full hearing of the merits of a cauſe.

DECREET, in the law of Scotland, a final decree or judgment of the lords of ſeſſion, from which an appeal only lies to parliament, where we find them but too often reverſed; a circumſtance ſurely not much to the honour of the auguſt bench, from whence the appeal lies.

DECREMENT, in heraldry, ſignifies the wane of the moon from the full to the new. See the article MOON.

The moon in this ſtate is called moon decreſſant, or in decours; and when borne in coat-armour, faces to the left ſide of the eſcutcheon, as ſhe does to the right ſide when in the increment. See the article CRESCENT.

DECREPITATION, in chemiſtry, the act of calcining ſalt over the fire, till it ceaſe to crackle. The deſign of this is to free the ſalt from ſuperfluous moiſture: but as it is thereby rendered porous, and apt to imbibe the humidity of the air, it muſt always be kept very cloſe afterwards, leſt the air ſhould moiſten it anew.

This term is alſo applied to the crackling of the ſalts during the operation.

DECRETAL, in the canon-law, a letter of a pope, determining ſome point or queſtion in the eccleſiaſtical law. The decretals compoſe the ſecond part of the canon-law. The firſt genuine one acknowledged by all the learned as ſuch, is a letter of pope Siricius, written in the year 385, to Himerus biſhop of Tarragona, in Spain, concerning ſome diſorders which had crept into the churches of Spain. Gracian publiſhed a collection of decretals, containing all the ordinances made by the popes, till the year 1150. Gregory IX. in 1227, following the example of Theodoſius and Juſtinian, formed a conſtitution of his own, collecting into one body all the deciſions, and all the cauſes, which ſerved to advance the papal power: which collection of decretals was called the pentateuch, becauſe it contains five books.

DECUMANA, in antiquity, a kind of very large ſhields, otherwiſe called albeſia, uſed by the Albenſes, a nation of the Marſi.

DECUMANNI DENTES, in heraldry, the ſame with dançette. See DANCETTE.

DECUPLE PROPORTION, that of ten to one. See the article PROPORTION.

DECURIO, in roman antiquity, a commander of ten men in the army, or the chief of a decury. See DECURY.

DECURIO MUNICIPALIS, a name given to the ſenators of the roman colonies.

DECURIO, as appears from an inſcription in Gruter, was alſo a name given to certain prieſts, intended for particular ſacrifices or other religious ceremonies. Struvius conjectures that their name was derived from their aſſiſting at the ſacrifices of private families and houſes.

DECURRENT LEAF, one which adheres immediately to the ſtalk of a plant, without any pedicle, and which has its lower part extended, and running a little way along the branch.

DECURY, ten perſons ranged under one chief, or leader, called the decurio. See the article DECURIO.

The roman cavalry was divided into decuries, which were ſubdiviſions of a century, each century containing ten decuries.

DECUSSATION, a term in geometry, optics, and anatomy, ſignifying the croſſing of any two lines, rays, or nerves, when they meet in a point, and then go on ſeparately from one another.

DECUSSORIUM, a ſurgeon's inſtrument, which, by preſſing gently on the dura mater, cauſes an evacuation of the pus collected between the cranium and the before-mentioned membrane, through the perforation made by the trepan.

DEDDINGTON, a market-town of Oxfordſhire, about fifteen miles north of Oxford: weſt longitude 1° 20′, and north latitude 51° 55′.

DEDHAM, a market-town of Eſſex, about thirty-five miles north-eaſt of Chelmsford: eaſt longitude 1° 10′, and north latitude 52° 5′.

DEDI, in conveyances, imports a warranty given to a feoffee and his heirs. See the article WARRANTY.

DEDICATION, a ſolemn devoting, or ſetting apart, any perſon or thing, to the ſervice of God, and the purpoſes of religion. See CONSECRATION.

Dedication of a temple was performed by the heathens in the following manner: early in the morning, on the day of dedication, the college of the pontiffs and other orders met, with a great crowd of people; and ſurrounding the temple, with garlands of flowers, the veſtal virgins holding branches of olive-trees in their hands, ſprinkled the outſide of the temple with luſtral water; then the perſon who conſecrated the temple, being the office of ſome great magiſtrate, as prætor, cenſor, *&c.* drew near the gate, with a pontiff at his ſide, to ſhew him the ceremonies; and holding with one hand the ſide-poſt of the gate, ſpoke thus: *Ades, ades, Lucelle,* (for example) *dum dedico templum hoc, ut mihi præeatis, poſtemque teneatis.* Then the pontiff, holding the ceremonial in his hand, pronounced aloud the form of the conſecration, which the conſecrating perſon repeated after him, and the ceremony was expreſſed in theſe words, *ſolemnia verba præeunte pontifice effari.* After which they conſecrated the court of the temple, by ſacrificing a beaſt, whoſe entrails were laid on an altar of green turf; then, having taken the ſtatue of the deity to whom it was conſecrated they anointed it with oil, and laid it on a pillow, rubbed with oil: the ceremonies being over, the conſecrating perſon had an inſcription, containing his name, quality, and the year of the conſecration, ſet upon the temple. This dedication was to be authorized by the ſenate and people, and the college of pontiffs was to give their conſent to it.

Feaſt of DEDICATION, an anniverſary feſtival among the Jews, in memory of Judas Maccabæus, who repaired and dedicated anew the temple and altar, which had been plundered and profaned by Antiochus Epiphanes. It was obſerved on the twenty-fifth of Ciſleu, and continued eight days.

The feaſt of DEDICATION, or rather the feaſt of a ſaint, or patron of a church, called in our law-books *dedicare,* was celebrated not only by the inhabitants of the place, but by thoſe of all the neighbouring villages, who reſorted thither; and ſuch aſſemblies were authoriſed by the king. The cuſtom is ſtill retained in ſome places, under the name of wakes, or vigils.

DEDICATION, in matters of literature, the inſcribing a book, poem, play, or the like, to ſome perſon of diſtinction, ſerving both as a protection to the piece, and a mark of the author's reſpect for the perſon to whom he dedicates his work.

Conringius has publiſhed a collection of dedications, which may be of uſe to thoſe employed in this way, as containing many obſervations relative to divinity, hiſtory, phyſics, *&c.* according to the different ſubjects of the books. He has ſubjoined

joined the prefaces and dedications of Puteanus, publiſhed by himſelf under the title of Pompæ Proſphoneticæ.

We cannot help obſerving, that dedications partake much of the nature of panegyric, being not only written in a pompous and florid ſtile, but full of the praiſes of the patron. See the article PANEGYRIC.

One of the moſt ſingular dedications we ever met with, and for which the author makes a very good apology, is that of the fourth part of Mr. Edwards's Hiſtory of Birds; it runs thus:

TO
GOD,

The ONE Eternal! the Incomprehenſible! the Omnipreſent! Omniſcient, and Almighty CREATOR of all things that exiſt! from Orbs immenſurably great, to the minuteſt Points of Matter, this ATOM is Dedicated and Devoted, with all poſſible Gratitude, Humiliation, Worſhip, and the higheſt Adoration, both of Body and Mind, by

his moſt reſigned, low,
and humble Creature,

GEORGE EDWARDS.

DEDIMUS POTESTATEM, in law, a commiſſion granted to one or more perſons, for the forwarding and diſpatching ſome act appertaining to a judge, or ſome court; as to take anſwers in chancery, depoſitions of witneſſes in a cauſe depending in that court, and levy a fine in the common pleas, &c. where perſons live in the country, or cannot travel.

DEDUCTION, in commerce, a ſubtracting or retrenching a little ſum paid, from a greater remaining yet unpaid.

DEDUTTIONE, in muſic, a name given to the riſing of the voice, in pronouncing the ſyllables *ut*, *re*, *mi*, *fa*, *ſol*, *la*; *quia per has deducitur vox*; in contradiſtinction to reductio, when the voice deſcends by theſe *la*, *ſol*, *fa*, *mi*, *re*, *ut*; *quia per has reducitur vox*.

DEE, the name of ſeveral rivers, as that on which Cheſter ſtands, that whereon Aberdeen ſtands, &c. See the articles CHESTER and ABERDEEN.

DEED, an inſtrument written on paper or parchment, comprehending ſome contract, bargain, or agreement between the parties thereto, in relation to the matter therein contained.

The validity of a deed conſiſts in three principal things, *viz.* writing, ſealing, and delivery. There are two kinds of deeds, *viz.* deeds indented, and deeds poll; which names chiefly import the ſhape of them, the one being cut in and out at top, and the other plain. A deed indented conſiſts of two or more parts; for there are tripartite, quadripartite, quinquepartite, &c. deeds, in which reſpective deeds it is expreſſed, that the parties thereto have interchangeably ſet their hands and ſeals. The reaſon of indenting is, that whereas the ſeveral parties have each of them one, the indenture may make it appear, that they belong to one and the ſame contract, by their tallying. The ſeveral parts of deeds by indenture appertain to the feoffer, grantor, or leſſor, &c. as to one part; the feoffee, grantee, or leſſee, of another part; and ſome other perſons, as truſtees, a third, &c. All the parts of an indented deed, in law, are judged to make but one entire deed, yet each part is of as great force as all the parts together.

A deed poll is that which conſiſts only of one part, without being indented. It is uſed where a grantor, or vender in a bill of ſale, &c. only ſeals: there is no need of a counterpart, the nature of the contract being ſuch, that it requires no covenant from the grantee.

DEEMSTERS, or DEMSTERS. All controverſies in the Iſle of Man are decided without proceſs, writings, or any charges, by certain judges, choſen yearly from among themſelves, called deemſters; there being two of them for each diviſion of the iſland: they ſit judges in all courts, either for life or property; and, with the advice of the twenty-four keys, declare what is law, in uncommon emergencies.

DEEP SEA-LINE, or DIP-SEA-LINE, in the ſea-language, a ſmall line to ſound with, ſome an hundred and fifty fathom long, with a hollow plummet at the head, and tallow put into it, to bring up ſtones, gravel, ſand, ſhells, and the like, from the bottom, in order to know the differences of the ground; which being entered from time to time, in their books, by comparing of obſervations, they gueſs by their ſoundings, &c. what coaſts they are on, though they cannot ſee land.

DEEPING, a market-town of Lincolnſhire, about thirty-five miles ſouth of Lincoln: weſt lon. 20′, and north lat. 52° 35′.

DEER, *cervus*, in zoology. See the article CERVUS.

DEER-HAYS, large nets, made of cords, to catch deer. Whoever keeps them, except in his own park, forfeits forty ſhillings a month.

DEER-STEALERS are puniſhable by various laws and ſtatutes, made from time to time. Any offender convicted of deer-ſtealing, before a judge of gaol-delivery, may be tranſported by 5 Geo. I. cap. xxviii. And it is felony for perſons to appear armed and diſguiſed in a foreſt or park, and hunt or kill the deer, by 6 Geo. I. cap. xxii.

DE ESSENDO QUIETUM DE TOLONIO, in law, a writ which lies for thoſe, who, by privilege, are free from the payment of toll, whenever they are diſturbed therein.

DE EXPENSIS MILITUM, in law, an antient writ, commanding the ſheriff to levy the expences of a knight of the ſhire, for his attendance in parliament, being four ſhillings a day. There is alſo another writ of the like nature, *de expenſis civium & burgenſium*, for levying two ſhillings a day, for the expences of every citizen and burgeſs of parliament.

DE FACTO, ſomething actually in fact, or exiſting, in contradiſtinction to de jure, where a thing is only ſo in juſtice, but not in fact; as a king de facto is a perſon that is in actual poſſeſſion of a crown, but has no legal right to the ſame; and a king de jure is the perſon who has a juſt right to the crown, though he is out of poſſeſſion thereof.

DEFAMATION, the ſpeaking ſlanderous words of another; for which the ſlanderer is puniſhable, according to the nature of his offence, either by action upon the caſe at common law, or by ſtatute, or in the eccleſiaſtical court. No damages are given in the eccleſiaſtical court, but the puniſhment of the party is by way of penance.

DEFAULT, in law, is generally taken for non-appearance in court, at a day aſſigned; but imports any omiſſion of that which we ought to do, for which judgment may be given againſt the defaulter. In the uſual ſenſe, if the plaintiff in a ſuit make default in appearance on a trial, he will be non ſuited; and where a defendant makes default, judgment ſhall be had againſt him by default. Jurors making default in their appearance, are to loſe and forfeit iſſues.

DEFECATE, or **DEFÆCATE**, in chemiſtry, a term applied to a body freed and purged from fæces and impurities. See the article CLARIFICATION, &c.

DEFECTIVE NOUNS, thoſe which want one of the numbers, or one or more caſes. See the article NOUN.

DEFEISANCE, or **DEFEASANCE**, in our law, a condition relating to ſome certain deed, which being performed, the deed is defeated and rendered void, as if it had never been made.

There is this difference between a common condition and a defeiſance, *viz.* that the condition is inſerted in, or annexed to the deed; but the defeiſance is a deed by itſelf which has relation to another deed.

DEFENCE, in fortification, all ſorts of works that cover and defend the oppoſite poſts, as flanks, caſemates, parapets, and fauſſebrays.

It is almoſt impoſſible to fix the miner to the face of a baſtion, till the defences of the oppoſite one are ruined, that is, till the parapet of its flank is beaten down, and the cannon, in all parts that can fire upon that face which is attacked, are diſmounted.

To be in a poſture of **DEFENCE**, is to be in a condition to reſiſt or oppoſe an enemy.

Line of **DEFENCE**, a ſuppoſed line drawn from the angle of the curtin, or from any other part in the curtin, to the flanked angle of the oppoſite baſtion. See the articles CURTIN and BASTION.

A line of defence repreſents the flight of a muſquet-ball from the place where the muſqueteers ſtand, to ſcour the face of the baſtion, and ought never to exceed the reach of a muſquet. It is either fichant or razant; the firſt is when it is drawn from the angle of the curtin to the flanked angle: the laſt, when it is drawn from a point in the curtin, razing the face of the baſtion.

DEFENCE, in law, ſignifies a plea, or what the defendant ought to make after the plaintiff's count, or declaration, *viz.* that he defends all the wrong, force, and damages, where and when he ought, &c. If the defendant would plead to the juriſdiction, he muſt omit the words *where and when he ought*; and if he would ſhew any diſability in the plaintiff, and demand judgment, if the plaintiff ſhall be anſwered unto, then he ought to omit the defence of the damage. There is a full defence uſually in perſonal actions.

DEFENCES, in heraldry, are the weapons of any beaſt, as the horns of a ſtag, the tuſks of a wild boar, &c.

DEFENDANT, in law, the perſon ſued

in an action perſonal; as tenant is he who is ſued in an action real. See the article ACTION.

DEFENDEMUS, in law, a word formerly uſed in gifts and grants, having this force, that it binds the donor and his heirs to defend the donee, if any perſons claimed right to, or laid any incumbrance on, the thing given, otherwiſe than is contained in the deed of gift.

DEFENDER *of the faith*, a peculiar title, belonging to the king of Great Britain, as Catholic does to the king of Spain, Chriſtian to the king of France, *&c.*

This title was firſt given by pope Leo X. to king Henry VIII. for writing againſt Luther.

DEFENDING, in fortification, the ſame with flanking. See the articles DEFENCE and FLANKING.

DEFENSITIVE, in ſurgery, ſignifies a bandage, plaſter, *&c.* to defend any part from external injuries.

DEFERENT, in anatomy, a term applied to certain veſſels in the body, that ſerve for the conveyance of humours from one part to another. See DEFERENTIA VASA.

DEFERENT, in the ptolemaic aſtronomy, a circle invented to account for the eccentricity, perigee, and apogee of the planets. See the articles EPICYCLE and PTOLEMAIC SYSTEM.

DEFERENTIA VASA, two white, ſolid, flatted tubes, one lying on the right ſide, the other on the left, from the epididymis, of which they are continuations: each of them runs up in the cellular vagina of the ſpermatic veſſels, as high as the openings in the abdominal muſcles; the blood veſſels lying forward, and the vas deferens behind them.

Their uſe is to carry the ſemen from the epididymes to the veſiculæ ſeminales; and, in the coitus, to diſcharge it into the urethra.

DEFICIENT HYPERBOLA, one with only one aſymptote, and two hyperbolical legs running out infinitely towards the aſymptote, but contrary ways. See the article HYPERBOLA.

DEFICIENT INTERVAL, in muſic, one leſs by a comma than it ought to be. See COMMA and INTERVAL.

DEFICIENT NUMBERS, thoſe whoſe parts or multiples added together, fall ſhort of the integer whereof they are the parts; ſuch is 8, its parts, 1, 2, 4, making only 7. See the article NUMBER.

DEFILE, in fortification, a ſtrait narrow paſſage, through which a company of horſe or foot can paſs only in file, by making a ſmall front; ſo that the enemy may take an opportunity to ſtop their march, and to charge them with ſo much the more advantage, in regard that thoſe in the front and rear, cannot reciprocally come to the relief of one another,

To DEFILE is to reduce an army to a ſmall front, in order to march through a defile.

DEFINITE, in grammar is applied to an article that has a preciſe determinate ſignification; ſuch as the article *the* in engliſh, *le* and *la* in french, *&c.* which fix and aſcertain the noun they belong to to ſome particular, as *the king*, *le roy*; whereas in the quality *of king*, *de roy*, the articles *of* and *de* mark nothing preciſe, and are therefore indefinite.

DEFINITION, the ſhewing the meaning of one word by ſeveral other not ſynonymous terms.

The meaning of words being only the ideas they are made to ſtand for, by him that uſes them, the meaning of any term is then ſhewed, or the word is defined, when, by other words, the idea it is made the ſign of, and is annexed to it in the mind of the ſpeaker, is, as it were, repreſented and ſet before the view of another; and thus its ſignification is aſcertained. This is the only end and uſe of definitions, and therefore the only meaſure of what is, or is not, a good definition.

The names then of ſimple ideas are incapable of being defined, becauſe the ſeveral terms of a definition ſignifying ſeveral ideas, they can altogether by no means, repreſent an idea which has no compoſition at all; and therefore a definition, which is properly but ſhewing the meaning of any one word by ſeveral others, not ſignifying the ſame each, can in the names of ſimple ideas have no place. Definitions, which then take place in compound ideas only, are of two ſorts: the definition of the name, which is the explanation of what any word means; and the definition of the thing, which explains in what the nature of that thing conſiſts. In order to form a definition of any thing, we muſt employ theſe three acts of the mind, firſt compare the thing to be defined with other things that are moſt like to itſelf, and ſee wherein its eſſence and nature agrees with them; and that is called the general nature or genus in a definition: ſo, if you would define what *wine* is, firſt compare it with other things like itſelf, as cyder, perry, *&c.* and you will find that it agrees eſſentially with them in this, that it is a ſort of juice. Secondly, conſider the moſt remarkable and primary attribute, property, or idea, wherein the thing differs from thoſe other things that are moſt like it, and that is its eſſential or ſpecific difference: ſo that wine differs from cyder and perry, and all other juices, in its being preſſed from a grape. This may be called its ſpecial nature, which diſtinguiſhes it from other juices.

Thirdly, join the general and ſpecial nature together, or the genus and the difference, and theſe make up a definition; ſo the juice of a grape, or juice preſſed from grapes, is the definition of wine. Here it muſt be obſerved, that in ſpeaking of the genus and difference, as compoſing a definition, it muſt always be underſtood, that the neareſt genus and ſpecific difference are required.

The next general nature, or the neareſt genus, muſt be uſed in a definition, becauſe it includes all the reſt: as if I were to define *wine*, I muſt ſay, *wine is a juice*, which is the neareſt genus; and not ſay, *wine is a liquid*, which is a remote general nature; or, *wine is a ſubſtance*, which is yet more remote, for *juice* includes both *liquid* and *ſubſtance*. Beſides neither of theſe two remote general natures would make any diſtinction betwixt wine and a thouſand other ſubſtances, or other liquids: a remote genus leaves the thing too much undiſtinguiſhed. The ſpecific difference is that primary attribute which diſtinguiſhes each ſpecies from one another, while they ſtand ranked under the ſame general nature or genus; ſo that the ſpecific difference of wine is its preſſure from the grape, as cyder is preſſed from apples, and perry from pears.

In definitions we muſt alſo uſe the primary attribute that diſtinguiſhes the ſpecies, or ſpecial nature; and not attempt to define wine by its particular taſtes, or effects, or rather properties, which are but ſecondary, or conſequential, when its preſſure from the grape is the moſt obvious and primary diſtinction of it from all other juices. In ſome caſes, indeed, it is not ſo eaſily known, which is the primary idea that diſtinguiſhes one thing from another; ſo ſome would as ſoon define winter by the coldneſs of the ſeaſon, as by the ſhortneſs of the days, though the ſhortneſs of the days is doubtleſs the moſt juſt, primary, and philoſophical difference; ſince winter-days are always the ſhorteſt, but not always the coldeſt; beſides, the ſhortneſs is one cauſe of the coldneſs, but the coldneſs is no cauſe of their ſhortneſs.

The ſpecial rules for a good definition are theſe: 1. A definition muſt be univerſal, or adequate, that is, it muſt agree to all the particular ſpecies or individuals that are included under the ſame idea. 2. It muſt be proper, and peculiar to the thing defined, and agree to that alone. Theſe two rules, being obſerved, will always render a definition reciprocal with the thing defined, that is, the definition may be uſed in the place of the thing defined; or they may be mutually affirmed concerning each other. 3. A definition ſhould be clear and plain; and indeed it is a general rule concerning the definition both of names and things, that no word ſhould be uſed in either of them, which has any difficulty in it, unleſs it has been before defined. 4. A definition ſhould be ſhort, ſo that it muſt have no tautology in it, nor any words ſuperfluous. 5. Neither the thing defined, nor a mere ſynonymous name ſhould make any part of the definition.

Though the defining by the genus and difference be the ſhorteſt way, yet it may be doubted whether it be the beſt; certainly it is not the only, and ſo not abſolutely neceſſary. Thus, *man* may be defined to be *a ſolid extended ſubſtance, having life, ſenſe, ſpontaneous motion, and the faculty of reaſoning*: and certainly the meaning of the word *man* would be as well underſtood as when it is defined *a rational animal*.

DEFINITION, in rhetoric, is defined by Cicero, a ſhort comprehenſive explanation of a thing.

The definitions of the orator, it muſt be obſerved, differ much from thoſe of the logician and philoſopher: the orators take a large compaſs, and define things more ornamentally: thus, *man is a curious work of an almighty Creator, framed after his own image, endued with reaſon, and born with immortality*: but this rhetorical definition, in ſtrictneſs, comes nearer to the nature of a deſcription, than any accurate definition.

DEFINITIVE, a term applied to whatever terminates a proceſs, queſtion, &c. in oppoſition to proviſional and interlocutory.

DEFINITOR is uſed for an aſſeſſor or counſellor of a general or ſuperior in monaſteries, or other religious places. See MONASTERY and CONVENT,

DEFLAGRATION, in chemiſtry, the

kindling or ſetting fire to a ſalt, mineral, &c. either alone or mixed for that purpoſe, with a ſulphureous one, in order to purify it.

The following proceſs is much recommended for its uſe in trying the ſtrength of brandies, or other vinous liquor: meaſure out a quantity of the liquor, and then heat it, and ſet it on fire; if, after it ceaſes to burn, the quaintity remaining is half as much as that meaſured out for the trial was, then the ſpirit is found to conſiſt of half water, and half totally inflammable ſpirit, that is, it is what we underſtand by perfect proof; and according as the remainder is more or leſs than half the original quantity, it is ſo much below or ſo much above proof. This method is much more certain than that by the crown of bubbles, which ariſes upon ſhaking the ſpirit in a phial. The above proceſs has been greatly improved by Monſ. Geoffroy. See Mem. Acad. Paris, 1718.

DEFLECTION, *of the rays of light*, a property which Dr. Hook obſerved in 1675, and read an account of before the Royal Society, March 18, the ſame year. He ſays, he found it different both from reflection and refraction, and that it was made towards the ſurface of the opaque body, perpendicularly.

This is the ſame property which Sir Iſaac Newton calls inflection. See the article INFLECTION.

DEFLOWERING, the act of taking away a woman's virginity. See VIRGINITY.

DEFLUXION, in medicine, the falling of humours from a ſuperior to an inferior part of the body. See CATARRH and PHTHISIS.

DEFLUXION *of the eyes*. See EYE.

DEFORCEMENT, in law, the caſting any one out of his land, or a with-holding of lands and tenements by force from the right owner.

DEFORCEMENT, in the law of Scotland, is uſed for reſiſting, or offering violence to the officers of the law, while they are actually employed in the exerciſe of their functions, by putting its orders and ſentences in execution.

The puniſhment of this crime is confiſcation of moveables, joined with ſome arbitrary puniſhment, as fine, impriſonment, baniſhment, or corporal pains, according to the degrees of violence, and other circumſtances which aggravate the crime.

DEFORCEOR, in law, a perſon that overcomes and caſts forth another from his lands and tenements by force, and differs from a diſſeiſor on this account. 1. That a man may be diſſeiſed without force. 2. A man may deforce another that never was in poſſeſſion, as where many have a right to lands, as common heirs, and one of them enters and keeps out the reſt. A deforceor likewiſe differs from an intruder who is made by a wrongful entry only into land, &c. void of a poſſeſſor, whilſt a deforceor is he that holds out againſt the right heir. See the articles DISSEISOR and INTRUSION.

DEFORMITY, the want of that uniformity neceſſary to conſtitute the beauty of an object. See the article BEAUTY.

The deformity of the body may be prevented by forming and moulding it in infancy, as by ſtroking up the calves of the legs to keep them from falling too low; and by ſtroking up the forehead, to keep it from ſinking, by proper bandages, &c.

According to a late ingenious writer, the proper province of a deformed perſon is the improvement of the mind; and his buſineſs, only ſuch as depends on ingenuity. If he cannot be a dancing-maſter, to adjuſt the heels, he may be a ſchoolmaſter, to inſtruct the head. He would appear ill, as a herald in a proceſſion; but may paſs very well, as a merchant upon the exchange. He cannot be a graceful actor on the ſtage, but he may produce a good play. He can acquire no glory by the ſword, but he may by the pen. On looking about him, he will find many avenues to fame barred againſt him: but ſome are ſtill open, thro' that of virtue; and thoſe, if he has a right ambition, he will moſt probably attempt to paſs.

In this manner does that truly ingenious writer apologize for, and make the encomium of deformity. See *Hay*'s Eſſay on Deformity.

DEGENERATION, or DEGENERATING, in general, denotes the growing worſe, or loſing ſome valuable qualities whereof a thing was formerly poſſeſſed.

Some naturaliſts have been of opinion, that things are capable of degenerating into a quite diſtinct ſpecies; but this is a chimera. All that happens, in the degeneration of a plant, for inſtance, is the loſing its uſual beauty, colour, ſmell, &c. a misfortune entirely owing to its being planted in an improper ſoil, climate, &c.

DEGLUTITION, in medicine, the act of ſwallowing the food performed by means of the tongue driving the aliment into the œſophagus, which, by the contraction of the ſphincter, protrudes the contents downwards.

DEGRADATION, the act of depriving a perſon for ever of a dignity or degree of honour, and taking away the title, badge and privileges of it.

DEGRADATION is alſo a puniſhment of delinquent eccleſiaſtics. The canon-law diſtinguiſhes it into two ſorts, the one ſummary, by word only; the other ſolemn, by ſtripping the perſon degraded of thoſe ornaments and rights which are the enſigns of his order or degree. The canoniſts likewiſe diſtinguiſh degradation from depoſition, underſtanding by the latter the depriving a man of his clerical orders, but by the former, only the removing him from his rank or degree. In the antient primitive church, degrading a clergyman was reducing him to the ſtate and communion of laymen, by which Voſſius and others underſtand the thruſting down a clergyman to communicate with laymen, without the rails of the chancel. The full import of the phraſe, however, is the depriving him of his orders, and reducing him to the ſimple condition of a layman, a puniſhent inflicted for ſeveral offences, as adultery, theft, or fraud: and clergymen thus reduced, were ſeldom allowed to recover their antient ſtation, except upon ſome great neceſſity, or very preſſing reaſon. Some have thought that degradation did not reduce the clergy to the ſtate of mere laymen, and that on account of the indelible character acquired by ordination, but this is an opinion unknown to the antient writers of the chriſtian church. Degradation in the romiſh church is attended with a great deal of ceremony. The offender is ſtripped of his pontifical veſtments, and at the ſame time the perſon who degrades him ſcrapes his fingers with a knife, or a little piece of glaſs, declaring to him that the power of conſecrating, bleſſing and ſanctifying, is taken from him: he eraſes the marks of the tonſure in the ſame manner, which a barber compleats by ſhaving his head all over.

DEGRADATION, in painting, expreſſes the leſſening the appearance of diſtant objects in a landſkip, in the ſame manner as they would apper to an eye placed at that diſtance from them. See the articles PERSPECTIVE and LANDSKIP.

DEGRADED CROSS, in heraldry, a croſs divided into ſteps at each end, diminiſhing as they aſcend towards the center, called by the french perronnée. See plate LXVII. fig. 8.

DEGREE, in geometry, a diviſion of a circle, including a three hundred and ſixtieth part of its circumference.

Every circle is ſuppoſed to be divided into three hundred and ſixty parts, called degrees, and each degree divided into ſixty other parts, called minutes; each of theſe minutes being again divided into ſixty ſeconds, each ſecond into thirds, and each third into fourths, and ſo on. See the articles MINUTE, SECOND, *&c.* By this means no more degrees or parts are reckoned in the greateſt circle than in the leaſt that is, and therefore if the ſame angle at the center be ſubtended by two concentrical arches, as many degrees are counted in the one, as in the other; for theſe two arches have the ſame proportion to their whole peripheries. For example. Let A C B (plate LXVII. fig. 9.) be an angle, and from the center C let there be deſcribed two arches, A B, D E, ſubtending the angle. There are as many degrees and minutes contained in the arch A B, as in the arch D E, altho' the radius of the arch A B were only a foot long, and the radius of the other reached the fixed ſtars. It is true indeed that a degree in the arch A B is ſo much leſs than a degree of the arch D E, as its radius C B is leſs than C E. The angle C is ſaid to be of ſo many degrees or minutes as the arch which ſubtends it contains of ſuch parts.

DEGREE *of latitude.* See LATITUDE.

DEGREE *of longitude.* See LONGITUDE.

A degree of the meridian on the ſurface of the globe is variouſly determined by various obſervers. Mr. Picart meaſured a degree in the latitude of 49° 21′, and found it equal to 57060 french toiſes. But the french mathematicians, who have lately examined Mr. Picart's operations, aſſure us, that the degree in that latitude is 57183 toiſes. Our countryman Mr. Norwood meaſured the diſtance between London and York, and found it 905751 engliſh feet, and finding the difference of latitudes 2° 28′, determined the quantity of one degree to be 367196 engliſh feet, or 69 engliſh miles, 288 yards. Mr. Maupertius meaſured a degree in Lapland, in the latitude of 66° 20′, and found it 57438 toiſes. A degree was likewiſe meaſured at the equator by other french mathematicians, and found to be conſiderably leſs than in the latitude of Paris. Whence it appears, that the earth is not a ſphere, but an oblate ſpheroid. See the articles EARTH, SPHEROID, *&c.*

Our theory of navigation being founded upon an hypotheſis of the degrees of latitude being all equal, muſt of conſequence be very erroneous, wherefore we here inſert a table of the degrees in the quadrantal arch of the meridian, both in the ſphere and ſpheroid with their differences, as calculated by the Rev. Mr. Murdoch.

A Table of Arches of the Meridian to the Spheroid and Sphere, in Minutes of the Equator.

Degrees	Spheroid.	Sphere.	Diff.
1	58.7	60.0	1.3
2	117.3	120.0	2.7
3	176.0	180.0	4.0
4	234.7	240.0	5.3
5	293.4	300.0	6.6
6	352.1	360.0	7.9
7	410.8	420.0	9.2
8	469.6	480.0	10.4
9	528.3	540.0	11.7
10	587.0	600.0	13.0
11	645.8	660.0	14.2
12	704.5	720.0	15.5
13	763.3	780.0	16.7
14	822.1	840.0	17.9
15	880.9	900.0	19.1
16	939.7	960.0	20.3
17	998.5	1020.0	21.5
18	1057.4	1080.0	22.6
19	1116.3	1140.0	23.7
20	1175.2	1200.0	24.8
21	1234.1	1260.0	25.9
22	1293.0	1320.0	27.0
23	1352.0	1380.0	28.0
24	1411.0	1440.0	29.0
25	1470.0	1500.0	30.0
26	1529.0	1560.0	31.0
27	1588.1	1620.0	31.9
28	1647.2	1680.0	32.8
29	1706.3	1740.0	33.7
30	1765.5	1800.0	34.5
31	1824.7	1860.0	35.3
32	1883.9	1920.0	36.1
33	1943.1	1980.0	36.9
34	2002.4	2040.0	37.6
35	2061.7	2100.0	38.3
36	2121.0	2160.0	39.0
37	2180.4	2220.0	39.6
38	2239.8	2280.0	40.2
39	2299.2	2340.0	40.8
40	2358.7	2400.0	41.3
41	2418.2	2460.0	41.8
42	2477.7	2520.0	42.3
43	2537.3	2580.0	42.7
44	2596.8	2640.0	43.2
45	2656.6	2700.0	43.4
46	2716.4	2760.0	43.6
47	2776.2	2820.0	43.8
48	2835.9	2880.0	44.1
49	2895.5	2940.0	44.5
50	2955.3	3000.0	44.7
51	3015.2	3060.0	44.8
52	3075.0	3120.0	44.9
53	3135.0	3180.0	45.0
54	3194.9	3240.0	45.1
55	3254.9	3300.0	45.1
56	3314.9	3360.0	45.1
57	3370.0	3420.0	45.0
58	3435.1	3480.0	44.9
59	3495.2	3540.0	44.8
60	3555.3	3600.0	44.7
61	3615.5	3660.0	44.5
62	3675.7	3720.0	44.3
63	3736.0	3780.0	44.0
64	3796.2	3840.0	43.8
65	3856.5	3900.0	43.5
66	3916.8	3960.0	43.2
67	3977.2	4020.0	42.8
68	4037.5	4080.0	42.5
69	4097.9	4140.0	42.1
70	4158.4	4200.0	41.6
71	4218.8	4260.0	41.2
72	4279.3	4320.0	40.7
73	4339.8	4380.0	40.2
74	4400.3	4440.0	39.7
75	4460.8	4500.0	39.2
76	4521.3	4560.0	38.7
77	4581.9	4620.0	38.1
78	4642.5	4680.0	37.5
79	4703.1	4740.0	36.9
80	4763.7	4800.0	36.3
81	4824.3	4860.0	35.7
82	4884.9	4920.0	35.1
83	4945.5	4980.0	34.5
84	5006.2	5040.0	33.8
85	5066.8	5100.0	33.2
86	5127.5	5160.0	32.5
87	5188.2	5220.0	31.8
88	5248.8	5280.0	31.2
89	5309.5	5340.0	30.5
90	5370.2	5400.0	29.8

DEGREE, *in the civil and canon law*, denotes an interval in kinſhip, by which proximity and remoteneſs of blood are computed. In computing degrees of conſanguinity, the rule of the civil law is univerſal, either in the direct or collateral, otherwiſe called the oblique line, for as many generations as there are, ſo many degrees there are likewiſe. But in the canon-law, the rule is different for the oblique line. And here a diſtinction is made between the equal and the unequal oblique line. In the firſt caſe the rule is, as many degrees as the perſons allied are diſtant from the common ſtock, ſo many they are diſtant from one another. In the other caſe the rule is: As many degrees as the moſt remote is diſtant from the common ſtock, ſo many the perſons are diſtant from one another. Hence the ſiſter of a perſon's grandfather by the civil law is diſtant from that perſon in the fourth degree; whereas, by the canon-law, ſhe is only in the third degree.

DEGREE, in chemiſtry, denotes the ſtate or intenſeneſs of fire. See FIRE.

Conjoint **DEGREES**. See CONJOINT.

DEGREES *of compariſon*, in grammar. See COMPARISON and POSITIVE, COMPARATIVE and SUPERLATIVE.

DEGREES, in muſic, are the little intervals whereof the concords, or harmonical intervals are compoſed. See the articles INTERVAL and CONCORD.

Muſical degrees are three, 1ſt. The greater tone whoſe ratio is 8 : 9. 2. The leſs tone, whoſe ratio is 9 : 10. and 3. The ſemitone, whoſe ratio is 15 : 16. By theſe alone a ſound can be moved upwards or downwards ſucceſſively, from one extreme of a concord to another, and produce true melody; and by means of theſe ſeveral voices are alſo capable of the neceſſary variety in paſſing from concord to concord. As to the original of theſe degrees, they ariſe out of the ſimple concords, and are equal to their differences. Thus 8 : 9, is the difference of a fourth and a fifth; 9 : 10, is that of a leſſer third and fourth, or of a fifth and greater ſixth; and 15 : 16, is the difference of a greater third and fourth, or of a fifth and a leſſer ſixth.

The degrees being only certain mediums contrived to be put betwixt the extreams of concords, for moderating their unequality, are of uſe only with regard to concords; ſo that when the voice has moved one degree, the ear is not ſatisfied 'till we come to the other, which therefore muſt be concord to the firſt ſound. By the fit diviſion therefore, of the concording intervals into leſſer ones, the voice will move ſmoothly from one note to another, and the hearer be prepared for a more exquiſite reliſh of the perfect intervals, whoſe extreams are the proper notes in which the ear finds the expected reſt and pleaſure. For the uſe of the degrees in the conſtruction of the ſcale of muſic. See SCALE and GAMUT.

DEGREES in the peripatetic philoſophy, are thoſe entities which being multiplied in the ſame ſubject render it more active, and that intenſively rather than extenſively.

Parodical **DEGREE**, in algebra. See the article PARODICAL.

DEGREE, in univerſities, denotes a quality conferred on the ſtudents or members thereof as a teſtimony of their proficiency in the arts or ſciences, and intitling them to certain privileges.

The degrees are much the ſame in all univerſities, but the laws thereof, and the previous diſcipline or exerciſe differ. The degrees are batchelor, maſter, and doctor, inſtead of which laſt, in ſome foreign univerſities, they have licentiate.

In each faculty, there are two degrees, batchelor and doctor, which were antiently called batchelor and maſter. In the arts likewiſe there are two degrees which ſtill retain the antient denomination, *viz.* batchelor and maſter. See BATCHELOR, MASTER, DOCTOR.

With regard to obtaining degrees at Oxford and Cambridge, matters are nearly on the ſame footing, only at Cambridge, the diſcipline is ſomewhat more ſevere, and the exerciſes more difficult. For the degree of batchelor of arts, beſides reſidence in the univerſity near four years, it is required that the perſon in the laſt year have defended three queſtions in natural philoſophy, mathematics, or ethics, and anſwered the objections of three ſeveral opponents at two ſeveral times; as alſo, that he have oppoſed three times. After which, being examined by the maſter and fellows of the college, he is referred to ſeek his degree in the ſchools, where he is to ſit three days, and be examined by two maſters of arts appointed for the purpoſe. For the degree of maſter of arts, the candidate is obliged three ſeveral times to maintain two philoſophical queſtions in the public ſchools, and to anſwer the objections brought againſt him by a maſter of arts. He muſt alſo keep two acts in the batchelors ſchool, and declaim once.

To paſs batchelor of divinity, the candidate muſt have been ſeven years maſter of arts: he muſt have oppoſed a batchelor of divinity twice, kept one divinity act, and preached before the univerſity once in latin, and once in engliſh.

For the degree of doctor, ſee DOCTOR.

DEICIDE, *deicida*, a term only uſed for the condemnation and execution of the Saviour of the world, by Pontius Pilate and the Jews.

DEJECTION, in medicine, the act of ejecting or evacuating the excrements. It is alſo applied to the excrements themſelves thus evacuated, in which ſenſe it is of the ſame import with ſtool. See the article STOOL.

DEJECTION, in aſtrology, is applied to the planets when they have loſt their influence, as is pretended by reaſon of their being in oppoſition to ſome others: It is the contrary of their exaltation. See the article EXALTATION.

DEIFICATION, in antiquity, the ſame with apotheoſis. See APOTHEOSIS.

DEINCLINERS, or **DEINCLINING DIALS**, are ſuch as both decline and incline, or recline at the ſame time. Thus, if a plane cut the prime vertical circle at an angle of thirty degrees, and the horizontal plane under an angle of twenty-four degrees, the elevation of the pole being fifty-two degrees, a dial drawn on this plane is called a deincliner. See DIAL.

DEISM, the ſyſtem of religion acknowledged by the deiſts. See the next article.

DEISTS, in the modern ſenſe of the word, are thoſe perſons in chriſtian countries, who acknowledging all the obligations and duties of natural religion, diſbelieve the chriſtian ſcheme, or revealed religion. They are ſo called from their belief in God alone, in oppoſition to Chriſtians. The learned Dr. Clarke, taking the denomination in the moſt extenſive ſignification, diſtinguiſhes deiſts into four ſorts. 1. Such as pretend to believe the exiſtence of an eternal, infinite, independent, intelligent Being, and who teach that this ſupreme Being made the world, though they fancy he does not at all concern himſelf in the management of it. 2. Thoſe who believe not only the being, but alſo the providence of God with reſpect to the natural world, but who not allowing any difference between moral good and evil, deny that God takes any notice of the morally good or evil actions of men; theſe things depending, as they imagine, on the arbitrary conſtitutions of human laws. 3. Thoſe who having right apprehenſions concerning the natural attributes of God, and his all-governing providence, and ſome notion of his moral perfections alſo; yet being prejudiced againſt the notion of the immortality of the human ſoul, believe that men periſh intirely at death, and that one generation ſhall perpetually ſucceed another, without any future reſtoration or renovation of things. 4. Such as believe the exiſtence of a ſupreme Being, together with his providence in the government of the world, as alſo the obligations of natural religion; but ſo far only, as theſe things are diſcoverable by the light of nature alone, without believing any divine revelation. Theſe laſt are the only true deiſts; but as the principles of theſe men would naturally lead them to embrace the chriſtian revelation, the learned author concludes there is now no conſiſtent ſcheme of deiſm in the world.

DEITY, a term frequently uſed in a ſynonymous ſenſe with God. See GOD.

DELEGATES, commiſſioners appointed by the king under the great ſeal to hear and determine appeals from the eccleſiaſtical court.

Court of DELEGATES. See COURT.

DELEGATION, *delegatio*, a commiſſion extraordinary given by a judge to take cognizance of, and determine, ſome cauſe, which ordinarily does not come before him.

DELEGATION, in the civil law, is a kind of nomination, whereby a debtor appoints one that is debtor to him, to anſwer a creditor in his place. This delegation differs from tranſferring, or tranſlation, in that three perſons intervene in a delegation, *viz.* the creditor, the debtor, and a third indebted to the debtor, whereas in a tranſfer, it is enough that the tranſferer and tranſferee be preſent.

DELETERIOUS, an appellation given to things of a deſtructive or poiſonous nature. See the article POISON.

DELF, denotes a quarry or mine, where either ſtone or coal is dug; but is more particulary uſed for the veins of coal lying under-ground, before it is dug up. A delf, or delve of coals, alſo denotes a certain quantity when dug.

Delf, in heraldry, is by ſome ſuppoſed to repreſent a ſquare rod or turf, and to be ſo called from delving, or digging. A delf tenne, is due to him that revokes his own challenge, or any way goes from his word; and to ſuch this is given as an abatement to the honour of their arms, and is always placed in the middle of the eſcutcheon. However, if two or more delfs are found in an eſcutcheon, they are not then to be looked upon as ſigns of an abatement, but of honour. Alſo, if it be of metal, or charged upon, it then becomes a charge of perfect bearing.

DELFT, a city of the united Netherlands, in the province of Holland, eight miles north eaſt of Rotterdam, and thirty ſouth-weſt of Amſterdam: eaſt long. 4° 5′, and north lat. 52° 6′.

DELIA, in antiquity, feaſts celebrated by the Athenians in honour of Apollo, ſurnamed Delius, the principal ceremony whereof was an embaſſy, or rather a pilgrimage to Apollo, performed every five years by a certain number of citizens, deputed for that purpoſe, called deliaſtæ, and the firſt perſon of the embaſſy architheorus: to him were added, four more of the family of the Ceryci, prieſts deſcended from Mercury, who reſided all the year at Delos, to aſſiſt in the temple. The whole deputation ſet out in five veſſels, carrying with them every thing neceſſary for the feaſt and the ſacrifices.

Delia was alſo a quinquennial feſtival in the iſland of Delos, inſtituted by Theſeus, at his return from Crete, in honour of Venus, whoſe ſtatue, given him by Ariadne, he erected on that place, having by her aſſiſtance met with ſucceſs in his expedition.

DELIAC, or **Deliacal problem**, a problem much celebrated in the writings of the antients, concerning the duplication of the cube. See the articles Duplication and Cube.

DELIBERATIVE, an appellation given to a kind, or branch, of rhetoric, employed in proving a thing, or convincing an aſſembly thereof, in order to perſuade them to put it in execution.

To have a deliberative voice in the aſſembly, is when a perſon has a right to give his advice and his vote therein. In councils, the biſhops have deliberative voices; thoſe beneath them have only conſultative voices.

DELICT, in the ſcotch law, denotes much the ſame with miſdemeanour. See the article Misdemeanour.

DELIGATION, in ſurgery, the binding up of wounds, diſlocations, fractures, *&c.* See the articles Wound, Dislocation, Fracture, *&c.*

DELIMA, in botany, a genus of plants belonging to the polyandria-monogynia claſs, with an elongated ſtyle: it has no flower-petals; the cup conſiſts of five leaves; the fruit is a bivalve capſule, and contains two ſeeds.

DELINEATION, or **Delineating**, the ſame with deſigning. See the article Designing.

DELINQUENT, a guilty perſon, or one who has committed ſome fault, or offence, for which he is puniſhable.

DEDIQUIUM, or **Animi Deliquium**, the ſame with lipothymia. See the article Lipothymia.

Deliquium, in chemiſtry, ſignifies the ſolution of any body, when expoſed to a cool and damp place, by the humidity it attracts from the air. The ſalt of tartar diſſolved in the above manner is called oil of tartar per deliquium.

DELIRIUM, in medicine, the production of ideas not anſwerable to external cauſes, from an internal indiſpoſition of the brain, attended with a wrong judgment following from theſe ideas, and an affection of the mind, and motion of the body, accordingly: and from theſe increaſed through various degrees, either alone or joined together, various kinds of deliria are produced.

The cauſes of deliria are numerous, ſuch as fevers, wounds in the head, internal inflammations, and immoderate loſſes of blood, whereby the brain is either diſordered or weakened. It alſo ariſes from the ſeed or menſes being retained in the womb, from the rotting of a gangrened member, *&c.* When a fierce and continual delirium is produced by an acute fever, from the brain itſelf originally affected, it is called a phrenſy: but a ſimple delirium only attends a violent fit of an intermitting fever, ſo that when the paroxyſm is off, the delirium ceaſes. See the article Phrensy.

Many are the ſigns of a delirium, as gnaſhing of the teeth, a fierce and wild aſpect, a pulſation in the hypochondrium and belly, watchings, vomiting of bile; in pains of the head, a tremor, or trembling of the tongue, *&c.* to all which Galen adds, the doing any thing unuſual or indecent.

Various methods of cure, and different remedies are to be choſe agreeable to the difference of the cauſes; but the chief of theſe remedies are warm bathing of the feet, with the application of bliſters to them, and to the hams; frictions upon the ſame parts; diluent clyſters often applied; a thin diet, and healing, quieting, deobſtruent and diluent drinks; emollient remedies applied to the head; gentle purges; bleeding in the foot, a bringing down of the piles, or menſtrual diſcharge, *&c.*

A delirium is always a bad ſign in wounds of the head, becauſe it denotes that the brain itſelf is injured.

DELIVERY, CHILD-BIRTH, or PARTURITION, in medicine and ſurgery, the bringing forth a perfect fœtus, or child, from its mother's womb, whether it be alive, or dead. See FOETUS.

In order to attain the knowledge of difficult childbirths, it is neceſſary to form a juſt idea of thoſe that are natural. The time of the natural birth is, from the 15th day of the ninth month, to the end of the 30th of the ſame: yet ſome women affirm it may be ſooner, or later. Hoffman ſays, the uſual time is nine ſolar months; and Junker, that excretions from the uterus being by women referred to certain lunar phaſes, they reckon their going with child by the weeks, and that they uſually exclude the fœtus forty weeks from the time of their being with child, commonly on that very day they were uſed to have their menſes.

The ſigns of an approaching delivery, are a remarkable deſcent of the womb, and a ſubſidence of the belly; the head of the fœtus falls down to the orifice of the womb, and preſſes upon it. See plate LXVIII. n° 1. The orifice of the womb dilates by the weight; and the chorion and amnios, being driven forward with the waters they contain, form a kind of pouch, or bladder, at the ſaid orifice; which ſhould be ſuffered to break of itſelf, or, at leaſt, it ſhould not be burſt till the woman is in labour. There is a flux of a whitiſh matter from the ſaid orifice; pains which extend from the loins and groin towards the genital parts: there is a frequent deſire to make water, or to go to ſtool; or a continual teneſmus: a flux of the waters from the membranes which contain the child immediately before the birth, or more early: a trembling of the lower joints: ſometimes the head achs, and the face looks intenſely red.

The infant gradually advances, the above protuberance continually enlarging the paſſage, that the crown of the head may be felt; the birth is then advanced one third; and the midwife may now aſſiſt the excluſion. When the infant is advanced forward, as far as his ears, he is ſaid to be in the paſſage. If the membranes are not already burſt, they may now be opened, and the waters by their effuſion, will render the vagina ſlippery, and promote the expulſion of the infant. When the child is born, the midwife ſhould lay him on her knees, ſo as to give iſſue to the waters from the mouth, if any has been imbibed: ſoon after, the placenta appears of itſelf, if not attached to the uterus: if otherwiſe, the midwife muſt ſeparate it gently, by introducing her hand. The navel-ſtring muſt now be cut, having firſt made a ligature as well on the child's ſide as on the mother's, to prevent a hæmorrhage. The midwife, at firſt, having aſked a few queſtions, ought to examine, by the touch, with the fore and middle finger, introducing them from time to time, to know the ſtate of the uterus; and, as the child advances, ſhe muſt relax the vagina by ſome oily remedy. The mother ſhould regulate her throws, and uſe her efforts all at once, not divide them, eſpecially when the head is advanced, that the ſhoulders may immediately follow, and the child eſcape the danger of ſtrangling.

After the child is born, and the afterbirth brought away, let a warm linen cloth be applied to the parts, but not ſo as to hinder the flowing of the lochia. An hour after, let the mother take a little oil of ſweet almonds, to eaſe the after-pains, and let a cataplaſm of the oil of ſweet almonds ℥ij. and two or three new laid eggs be boiled together, and laid to the parts, renewing it every ſix hours, for two days: fifteen days after the birth, the parts may be bathed with an aſtringent decoction of red roſes, balauſtines, or nut-galls, in red wine, in order to brace them. If the labour is long and difficult, it will be proper to bleed, to prevent inflammations, and to give a little Alicant-wine, or with the addition of Cinnamon-water, or confectio alkermes, not forgetting an oily clyſter.

A difficult DELIVERY may be cauſed by the mother, the midwife, or the fœtus. The fault is in the mother, if, when the orifice of the womb is open, and the child rightly placed, ſhe has not ſtrength to expel the fœtus, eſpecially if the waters are come away, and the pains ceaſe: or when the mother will not exert herſelf; or there is a natural fault in the genital parts. In a defect of ſtrength, or pains, all elſe being right, a draught of generous wine ſhould be given, with cinnamon and mace, again and again, if the work does not go forward. If there wants a greater ſtimulus, borax, cinnamon, or myrrh, may be given, with a proper drink, which muſt be repeated in an hour or two, if occaſion requires. But the abuſe of forcing medicines is dangerous: ſtimulating clyſters may be injected now and then, eſpecially if the woman is coſtive. The midwife ſhould alſo preſs back the os coccygis, which tends to excite the pains, and to eaſe the labour. If the parts are overſtrait, as in the firſt birth, eſpecially if the woman is not young, emollient liniments are to be uſed, and the parts muſt be anointed with freſh butter, or oil, and be dilated gently with the fingers. If there is a tumor, caruncle, or membrane, oppoſing the birth, a ſurgeon's aſſiſtance is required.

The midwife is in fault, when ſhe haſtens the labour before the time, when there is no true pains, when the orifice of the uterus is not open, which alone diſtinguiſhes the true pains from falſe: the true time of birth muſt be waited for: the woman muſt be compoſed, and her ſpirits kept up with comfortable liquors.

If the fault is with the fœtus; and the head too large, or the ſhape monſtruous, or the ſituation preternatural, then forcing medicines are fruitleſs and noxious; and the fœtus is brought forth by the feet, by a ſkilful hand, or the inſtrument called embryulcus, (ibid. n° 10, 11.) whether alive or dead. See EMERYULCUS.

If the feet preſent firſt (ibid. n° 2.) the midwife muſt be wary, leſt there be twins, and leſt ſhe ſhould take a foot of each: the feet muſt be wrapped in a dry napkin, and the child muſt be drawn gently, till the waſte is in the orifice of the uterus: then the infant's hands ſhould be drawn cloſe by the ſides; and if the noſe be towards the os pubis, it ſhould be turned towards the coccyx, to prevent an obſtacle. Then, the orifice muſt be dilated with the fingers, and the woman's throws ſhould aſſiſt the midwife's efforts to educe the child. If the chin is embarraſſed, the midwife muſt diſengage it, by putting her finger into the mouth, in order to turn it to advantage.

If the infants head preſents acroſs, (ibid. n° 3.) it muſt be put back, and gently turned to its natural ſituation; and if the ſhoulder preſents, the ſame art muſt be uſed (ibid. n° 4.) If the belly, hip, or thigh, appears firſt, (ibid. n° 5.) the child muſt be extracted by the feet, and the mother muſt lie horizontally on her back. If one or both hands are directed upwards, and lie cloſe to the head, (ibid. n° 6.) the caſe is not ſo bad as ſome apprehend, for they will keep the orifice equally dilated, till the head paſſes, and prevents ſtrangling. If one hand, or one foot appears, they muſt be returned, and the infant brought forth by the head in the former caſe, and by the feet in the latter. (n° 7, and 8.)

If the infant is dead, there is generally a collapſion of the abdomen; the breaſts are flaccid; the infant bears on the lower part of the pelvis, and the child, upon motion, rolls like a lump of lead. The bones of the ſkull are wrapped over one another; an ichorous lymphatic ſanies flows from the uterus; the mother is ſubject to fainting. There is no pulſation in the navel-ſtring; it is ſoft and indolent to the touch, and abſolutely deprived of motion. If the placenta comes firſt, and is hot, the child is alive, Above all, if any part of the infant's body appears, and is full of ſmall veſicles livid, ſoft, and brittle, it is not only dead, but beginning to putrify. In theſe caſes he muſt be extracted by the feet, and if it cannot be done otherwiſe, with an inſtrument; but a man midwife's aſſiſtance muſt not be neglected.

When the fœtus dies before the time of birth, and the membranes continue whole it will not putrify: therefore the work muſt be left to nature, for birth-pains will at length come on ſpontaneouſly.

If the navel-ſtring appears firſt, and is compreſſed ſoon after by the head of the infant, its life is in danger, and the remedy is to return the infant, and reduce the cord, till the head fills the orifice: but if this cannot be done, the woman muſt be put in a ſuitable poſture, and the child muſt be extracted by the feet. When the placenta preſents itſelf, which is known by its ſpungy, ſoft, texture, and the great quantity of blood flowing at the ſame time, it requires ſpeedy aſſiſtance. If the membranes are entire, they ſhould be broke; the placenta and membranes ſhould be reduced into the uterus, and the child be extracted by the feet; which is more eaſily performed in the membranes, than in the uterus, and put into a proper ſituation: but if the placenta is diſengaged from its membranes, and theſe are broke, and the placenta, or both, appear before the infant, they may be brought away firſt, and the infant immediately afterwards.

When there is a great flux of blood from outward accidents, the infant ſhould be immediately delivered by art, though the mother is not in true labour. If the uterus is opened, and the vagina relaxed, as in this caſe they commonly are, the child muſt be extracted by the feet; if not, they muſt be mollified with freſh oil, and the infant delivered as before.

After all laborious births, the woman is generally weak, and apt to faint: therefore, her ſpirits ſhould be kept up by a glaſs of hot wine, or analeptic water, which muſt be repeated as oft as there is occaſion.

If after the child is born, the placenta does not ſoon follow, and it adheres to the womb, the woman is not to change her poſture immediately, but the midwife's hand is to be introduced into the womb, as far as the placenta, taking the navel-ſtring for a guide; and taking hold of it, ſhe is to move it gently to and fro, in order to looſen and extract it. ibid. n° 9. If it adheres too cloſely, it is not to be pulled forcibly, or broken: it will be beſt to wait half an hour, keeping the hand in the uterus, for fear of its cloſing, till it comes away of itſelf, or may be ſeparated without force. If, through the unſkilfulneſs of the midwife, the orifice of the womb cloſes, before it is come away, aloetic pills muſt be taken every evening. If it putrifies, the patient dies, or falls into dangerous fevers. See the article PLACENTA.

After delivery, the woman ſhould be put into bed, and a folded ſheet put under her hips, in order to receive the lochia. See the article LOCHIA.

Warm linen ſhould be applied to the genital parts, to keep out the air, and a compreſs, dipped in warm wine, ſhould be applied to the belly, but not too tight.

If there are violent pains after delivery, they generally proceed from the afterbirth's being retained, or part of it; from blood clotted, or concreted, in the uterus; from hard labour; from a defect in the flux of the lochia; or from wind, eſpecially if the woman has not been ſwathed in a proper way. In this caſe, hot diluents are proper, or an infuſion of camomile flowers, drank as tea, or broths with caraway ſeeds; or wormwood, or camomile flowers; or thin orange peel ʒj. or a bitter tincture in a proper infuſion, taken hot. An ounce or two of oil of ſweet almonds, taken in a hot vehicle, is excellent.

DELLY, the capital of a province of the ſame name, and at preſent of all the hither India: eaſt long. 79°. and north lat. 28°.

It is a large and populous city, ten miles in circumference.

DELOS, the principal of the Cyclades-iſlands, in the Archipelago: eaſt long. 25° 50′, and north lat. 37° 26′.

DELPHIN, or DOLPHIN. See the article DOLPHIN.

DELPHINIUM, LARK SPUR, in botany, a genus of the polyandria-trigynia claſs of plants, the corolla of which conſiſts of five unequal petals, diſpoſed circularly; of theſe the upper one is anteriorly more obtuſe than the others, and is emarginated, and extended behind into a tubulated horn, which is ſtraight, long, and obtuſe; the others are of an ovato-lanceolated figure, patent and nearly equal: the fruit conſiſts of one or three capſules, of an ovato-ſubulated figure, ſtraight, compoſed of a ſingle valve, and opening inwards: the ſeeds are numerous and angular: theſe ſeeds called ſtaphiſagria, or ſtaveſacre, in the ſhops, are uſed to deſtroy vermin in childrens heads. See plate LXIX. fig. 1.

DELPHINUS, in ichthyology, a genus of fiſhes, of the order of the plagiuri, the characters of which are, that they have teeth in each jaw, that the fiſtula is ſituated in the middle of the head, and that the back is pinnated, or furniſhed with fins.

To this genus belong the dolphin, the porpeſſe, and the grampus, or north caper. See the articles DOLPHIN, *&c.*

DELPHINUS, in aſtronomy, a conſtellation of the northern hemiſphere, whoſe ſtars in Ptolemy's and Tycho's catalogues are ten, and in Mr. Flamſteed's eighteen.

DELTOIDES, in anatomy, a thick triangular muſcle of the arm, being one of the three elevators. See the article ELEVATOR.

This muſcle ariſes from the clavicle, and the acromion and ſpine of the ſcapula; and terminates, at four fingers breadth below the neck of the humerus. See the article HUMERUS.

DELUGE, *deluvium*, an inundation, or overflowing of the earth, either wholly, or in part, by water.

We have ſeveral deluges recorded in hiſtory, as that of Ogyges, which overflowed almoſt all Attica, and that of Deucalion, which drowned all Theſſaly, in Greece: but the moſt memorable was that called the univerſal deluge, or Noah's flood, which overflowed and deſtroyed the whole earth, and out of which only Noah, and thoſe with him in the ark, eſcaped.

Men have been very ſolicitous to account for this cataſtrophe philoſophically, and to diſcover from whence ſuch an amazing quantity of waters could come, as were neceſſary to cover all our globe, to the height of fifteen cubits, above the higheſt hills: for to that height Moſes expreſsly ſaith, *Gen.* vii. 20. "the waters "prevailed." Some have ventured to deny there were any mountains at all before the flood, though he expreſsly mentions them as a ſtandard for the height of the waters. Others have denied the univerſality of the deluge, though the words of the text be, "That all "the hills over the whole earth were "covered." Others have had recourſe to the ſhifting of the earth's center of gravity, and therefore, will have all parts drowned ſucceſſively; and our famous theoriſt, Dr. Burnet, fancies an earth made on purpoſe to be drowned at that time, which being in form of an orbicular cruſt on the face of the ſea, as we now call it (for he ſays, there was none before the deluge) fell down into the water, and ſo drowned its inhabitants.

But the holy ſcriptures tell us, that the waters of the deluge came from two funds, "the great deep below," and the "rains above." Again, when we look to the internal parts of the earth, even to the greateſt depth men have ever reached, we find that the body of the terreſtrial globe is compoſed of ſtrata, or layers, lying over one another, which appear to be ſediments of a flood: beſides, in the bodies of theſe ſtrata, though never ſo ſolid, nay, even incloſed within the ſolidity of the firmeſt flints, marble, ſtone, &c. we find a prodigious variety of the exuviæ, or remains of fiſhes, ſuch as their ſhells, teeth, &c. as well marine ones, as thoſe which live in lakes and rivers; and from a due obſervation of theſe, and repeated conſiderations upon them, it was, that the learned Dr. Woodward founded what he delivers upon this ſubject, which therefore is not ſo much a theory of the earth, as neceſſary deductions, and unavoidable conſequences, drawn from the matters of fact, as they are laid down in the ſecond part of his natural hiſtory of the earth.

1. That theſe marine bodies, and the other ſpoils of freſh-water fiſhes, were borne forth out of the ſea by the univerſal deluge, and on return of the water back again from off the earth, they were left behind on land.

2. That during the time of the deluge, all the ſtone and marble of the antediluvian earth, all the metals in it, all the mineral concretions, and in a word, all foſſils whatever, that had before attained any ſolidity, were totally diſſolved; their conſtituent corpuſcles disjoined, and their coheſion perfectly ceaſed; and that the ſaid corpuſcles, together with the corpuſcles of thoſe which were not before ſolid, ſuch as ſand, earth, and the like; as alſo, all animal bodies, teeth, ſhells, vegetables, in ſhort, all bodies whatever, that were either upon the earth, or that conſtituted the maſs, if not quite down to the abyſs, yet to the greateſt depths we ever dig, were aſſumed up promiſcuouſly into the water, and ſuſtained therein; ſo that the water and theſe bodies made up one common maſs.

3. That at length, all the maſs that was thus borne up in the water, was again precipitated, and ſubſided toward the bottom, and that this ſubſidence happened generally according to the laws of gravity. See the article GRAVITY.

That the matter ſubſiding thus, formed the ſtrata of ſtone, earth, marble, coal, &c. of which ſtrata the terreſtrial globe, or, at leaſt, as much of it as hath been diſplayed to human view, doth mainly conſiſt.

4. That the ſtrata of marble, &c. attained their ſolidity as ſoon as the ſand,

or other matter, whereof they conſiſt, was arrived at the bottom, and well ſettled there; and that all thoſe ſtrata which are ſolid at this day, have been ſo ever ſince that time.

5. That theſe ſtrata were originally parallel, plane, and regular, and conſequently rendered the ſurface of the earth even and ſpherical; that they were contiguous, and not broken and interrupted as we find them now; and that the water lay then upon them, conſtituting a fluid ſphere, invironing all the globe round.

6. That after ſome time, by the force of an agent ſeated within the earth, thoſe ſtrata were broken on all ſides of the globe; that they were diſlocated, and their ſituation varied; from whence theſe elevations and depreſſions on the ſurface of the globe, as the mountains, vallies, and other inequalities.

And afterwards, he concludes from his obſervations,

1. That Noah's deluge was quite univerſal, covering the whole earth, even the higheſt mountains quite round the globe.

2. That, at the time of the deluge, the water of the ocean was firſt brought out on the earth, and immediately ſucceeded by that of the abyſs.

3. That, upon the diſruption of the ſtrata, or the elevation of ſome, and the depreſſion of others, towards the end of the deluge, this maſs of water fell back towards the loweſt parts of the earth, into lakes, and other cavities, into the channel of the ocean, and through the fiſſures, by which this communicates with the ocean, in the abyſs which it filled, till it came to an equilibrium with the ocean.

4. That the deluge commenced in the ſpring ſeaſon, the waters coming forth upon the earth in the month which we call May.

5. That the deluge did not happen, from an accidental concourſe of natural cauſes; but that many things then happened, which never could poſſibly happen, without the aſſiſtance of a ſupernatural power.

Mr. Whiſton, on the contrary, in his new theory of the earth, ſuppoſes the deluge began on the 18th of November, in the 2365 year of the Julian period, that is, 2349 years before the Chriſtian æra; that a comet deſcending towards its perihelion, in the plane of the ecliptic, paſſed quite near the globe of the earth, the very ſame day that the deluge began: he aſcribes to the univerſal deluge all the changes and alterations that have happened in the ſurface and inſide of the globe: he adopts the hypotheſis of Dr. Woodward, and indiſcriminately makes uſe of all the obſervations of this author, with regard to the preſent ſtate of the globe.

The terreſtrial globe having once met with the tail of the comet, conſiſting of a tranſparent fog, or aqueous atmoſphere, it muſt, in paſſing through it, appropriate to itſelf ſome part of the matter it contained. All that was found within the ſphere of attraction of the globe, muſt have fallen upon the earth, and that in form of rain, ſince this tail partly conſiſted of aqueous vapours. This tail being "the cataracts of heaven that were opened," the rain may be made as plentiful as one pleaſes, even to occaſion an univerſal deluge, the waters of which would eaſily cover the higheſt mountains. However, Mr. Whiſton does not attribute the whole deluge to theſe waters only, for, agreeable to ſcripture, he affirms that the earth, upon the approach of the comet, would no doubt feel the force of its attraction; ſo that the fluid, contained in the great abyſs, would be agitated by ſo violent a flux and reflux, that the ſuperficial cruſt of the earth could not reſiſt it, but be broken in ſeveral places; and the internal waters diffuſed over the ſurface, "and the fountains of the great deep broken up."

Mr. Whiſton, to diſpoſe of all this water, ſuppoſes, that as ſoon as the earth in continuing its courſe, had got ſome way from the comet, the effects of its attraction, the flux and reflux ceaſed in the great abyſs, and then the ſuperior waters were violently precipitated through the ſame paſſages by which they came out; the great abyſs ſwallowed up all the ſuperfluous waters, and its cavity was found capable enough to receive not only the waters which it had already contained, but alſo all thoſe which the tail of the comet had left behind it; ſince during the time of its agitation, and the burſting of its cruſt, it had enlarged the ſpace by breaking down, on all hands, the earth that environed it. It was, in like manner at this time, that the earth, which till then was ſpherical, became elliptic, occaſioned not only by the effect of the centrifugal force cauſed by its diurnal revolution, but likewiſe by the action of the comet ; and that becauſe the earth, in paſſing through the tail of the comet, was ſituated in ſuch a manner, that it preſented its equatorial parts to this body ; and becauſe the force of the comet's attraction, concurring with this centrifugal force of the earth, took away thoſe parts of the equator with ſo much the more facility, as the cruſt was broken and disjoined in a vaſt many places ; and becauſe the action of the flux and reflux of the abyſs made a more violent impreſſion upon the parts under the equator, than any where elſe.

Dr. Halley reſolves the deluge into the ſhock of a comet, or ſome other ſuch tranſient body ; the great agitation that muſt have been occaſioned by it in the ſea, he obſerves, would be ſufficient to account for all thoſe ſtrange appearances of heaping vaſt quantities of earth, and high cliffs upon the beds of ſhells, which once were the bottom of the ſea, and raiſing up mountains, where none were before : ſuch a ſhock as this, impelling the ſolid parts, would occaſion the waters, and all fluid ſubſtances that were unconfined, as the ſea is, to run violently with an impetus toward that part of the globe where the blow was received, and that with force ſufficient to take with it the very bottom of the ocean, and would carry it upon land.

There are various other ſyſtems of the univerſal deluge, ſeveral of which may be ſeen in Monſ. Buffon's Natural Hiſtory, Tom. I.

DEMAIN, or **DEMESNE**, in its common acceptation, is uſed for the lands round a manor-houſe, occupied by the lord. See the article MANOR.

DEMAIN, or **DEMESNE**, in law, is commonly underſtood to be the lord's chief manor-place, with the lands thereto belonging, which he and his anceſtors have time out of mind kept in their own manual occupation, for the maintenance of themſelves and their families. See the article MANOR.

DEMAIN denotes alſo all the parts of any manor not in the hands of freeholders. And it is frequently uſed for a diſtinction between theſe lands, *&c.* that the lord of the manor has in his own hands, or of his leſſee demiſed at a rack rent ; or ſuch other land appertaining to the manor, which belongs to free or copyholders.

DEMAIN is ſometimes taken in a more ſpecial ſenſe, as oppoſite to frank-fee ; ſuch lands as were in the poſſeſſion of Edward the confeſſor, being called antient demeſne, and all others frank-fee. In England, no private perſon has any demeſnes, according to the ſimple acceptation of the word, becauſe there is no land but what depends mediately or immediately upon the crown, as of ſome honour belonging to it, and not granted in fee to any inferior perſon ; wherefore when a perſon in pleading would ſignify the land to be his own, he ſays, that he is ſeized thereof in his demain as of fee ; by which it appears, that tho' his land be to him and his heirs for ever, yet it is not true demeſne, but depending upon a ſuperior lord, and is held by rent or ſervice.

DEMAND, in law, the calling upon a perſon for any thing that is due.

There are two kinds of demands, the one in deed, and the other in law. And theſe are again divided into three ſorts, one in writing, without ſpeaking, as in every writ of præcipe ; one other without writing, being a verbal demand of the perſon who is to perform ſomething ; and another made without either word or writing, which is termed a demand in law, as in caſes of entries on lands, *&c.* And, as an entry upon land and taking diſtreſs for rent, are a demand in law of the land and rent, ſo the bringing an action of debt for money due on a bond, is a demand in law of the debt.

A demand is to be legal, and made in ſuch a manner as the law directs ; if for rent reſerved on a leaſe of a meſſuage and lands, it ought to be made at the fore door of the houſe ; and of land, on the moſt public part thereof. If a leſſor or landlord in demanding of rent to re-enter, demands one penny more or leſs than is actually due to him, or does not ſhew the certainty of the rent, the day of its payment, and when due, it will not be a good demand. Debts and claims are to be demanded in time by the ſtatute of limitations, or they will be loſt by law.

DEMANDANT, in law, is the plaintiff in all real actions, wherein land, *&c.* is demanded ; for theſe actions are by demands, as perſonal actions are by plaints.

DEMARCHUS, δημαρχος, in antiquity, the principal magiſtrate of the city Neapolis ; alſo a magiſtrate who had the government of one of the diſtricts of Attica, anſwering in ſome meaſure to our ſheriffs.

DEMEMBRE', in heraldry, is ſaid of diſmembred animals, or thoſe with their limbs cut off.

DEMER,

Fig. 1. DELPHINIUM, *LARK'S SPUR.*

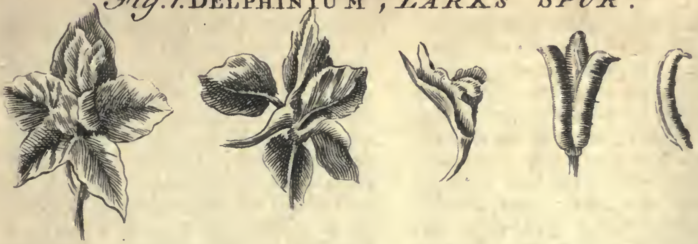


Fig. 2 DERMESTES.

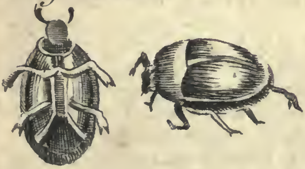


Fig. 3. DEMI-CROSS.

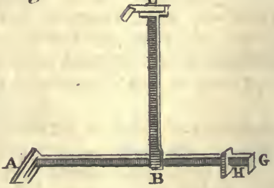


Fig. 4. DENTALIA.

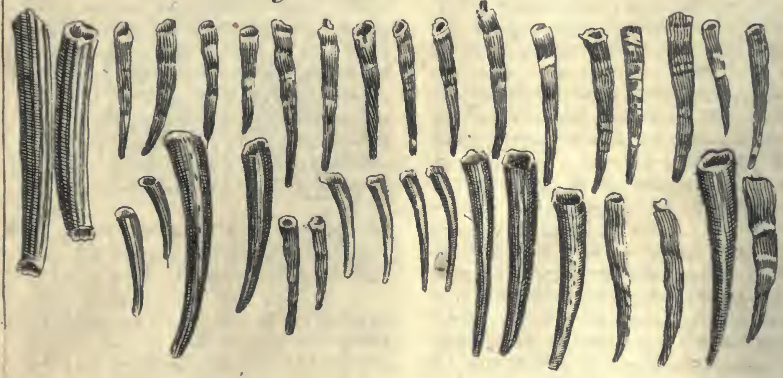


Fig. 5. DESIGNING.

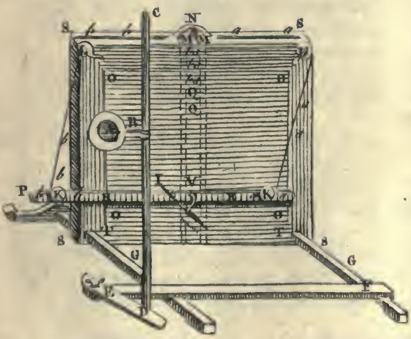
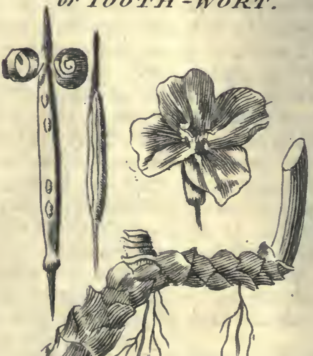


Fig. 6. DENTARIA, *or TOOTH-WORT.*



J. Jefferys sculp

DEMER, a river in the Auſtrian Netherlands, on which the city of Mechlin ſtands.

DEMESNE, the ſame with demain. See the article DEMAIN.

DEMETRIA, a feſtival celebrated by the Greeks in honour of Ceres, called δημητηρ; wherein it was uſual for the devotees to laſh themſelves.

DEMETRIOWITZ, a city of the dutchy of Smolenſko, in the ruſſian empire, ſituated upon the river Ugra, in 37° eaſt long. and 52° 30′ north lat.

DEMI, a word uſed in compoſition with other words to ſignify half. In words borrowed from the Latin we uſe ſemi. See the article SEMI.

DEMI-BASTION, a fortification having only one face and one flank. See BASTION.

DEMI-CANNON *loweſt*, the name of a piece of ordnance generally about ſix inches bore, 5400 pound weight, ten or eleven feet long, and carrying a ſhot of about thirty pound weight. It carries point blank 156 paces.

DEMI-CANNON *ordinary*, is $6\frac{1}{2}$ inches bore, 12 feet long, and weighs 5600 pound. It carries a ſhot of $6\frac{1}{8}$ inches in diameter, whoſe weight is 32 pounds, and ſhoots point blank 162 paces.

DEMI CANNON *of the longeſt ſize*, is $6\frac{3}{4}$ inches bore, 12 feet long, and weighs 6000 pounds weight. It ſhoots point blank 180 paces.

DEMI-CROSS, an inſtrument uſed by the Dutch to take the ſun's altitude, or that of a ſtar, at ſea. It conſiſts of a ſtaff AG (See plate LXIX. fig. 3.) divided into a line of tangents, and a croſs piece or tranſum BE. It is furniſhed with three vanes; a horizon vane, at A; a ſight vane, at H; and the ſhade vane, at E.

To take the ſun's altitude by this inſtrument, hold it with the croſs piece B E as upright as you can; and looking thro' the ſight vane at H, obſerve the horizon thro' the ſlit in the horizon vane A, and ſlide the croſs piece to and fro till the ſhade of the vane at E fall likewiſe upon the ſlit of the horizon vane A; then are the degrees cut on the ſtaff A G, by the edge of the croſs piece B E, the altitude of the ſun required. But to find the height of a ſtar, you muſt remove the horizon vane A, and put it on the end G, and transfer the ſight vane H to A; then holding the inſtrument upright, as before, obſerve the horizon through the ſight vane and horizon vane, and the ſtar through the ſight vane and ſhade vane, and then the tranſum will cut the degrees of the ſtar's altitude on the ſtaff A G; allowing about eight or ten minutes for your height above the level of the water. Inſtead of the demi-croſs, we uſe the croſs ſtaff or fore-ſtaff. See FORE-STAFF.

DEMI CULVERIN, a piece of ordnance uſually $4\frac{1}{2}$ inches bore, 2700 pound weight, ten feet long, and carrying point blank 175 paces.

DEMI-CULVERIN *of the leaſt ſize*, is $4\frac{1}{4}$ inches bore, 10 feet long, and 2000 pounds weight. It carries a ball of 4 inches diameter, and of 9 pounds weight, and its level range is 174 paces.

DEMI-CULVERIN *of the largeſt ſort*, is $4\frac{3}{4}$ inches bore, $10\frac{1}{3}$ feet long, and weighs 3000 pounds weight. It carries a ball $4\frac{1}{2}$ inches diameter, weighing 12 pounds 11 ounces, point blank 178 paces.

DEMIDITONE, in muſic, is the ſame with a third minor. See the article THIRD.

DEMI-HAQUE. See HARQUEBUSS.

DEMI-GOD, *&c.* See GOD, HERO, *&c.*

DEMI-GORGE, in fortification, is that part of the polygon which remains after the flank is raiſed, and goes from the curtin to the angle of the polygon. It is half of the vacant ſpace or entrance into a baſtion. See the article GORGE.

DEMI-LUNE, *half moon*, in fortification, an outwork conſiſting of two faces and two little flanks, frequently built before the angle of a baſtion, and ſometimes alſo before the curtin, tho' now much diſuſed.

DEMI-QUAVER, a note in muſic, two of which are equal to a quaver. See the article QUAVER.

DEMI-SEMI-QUAVER, in muſic, the ſhorteſt note, two of them being equal to a ſemiquaver.

DEMI-VOLT, in the manege. See the article VOLT.

DEMISE, in law, is applied to an eſtate either in fee, for term of life or years, tho' moſt uſually the latter. The king's death in law is termed the demiſe of the king, which does not diſcontinue any writ or proceſs, nor determine any commiſſion civil or military, nor a parliament till after ſix months.

DEMISE and REDEMISE, a conveyance where there are mutual leaſes made from one to another of the ſame land, or ſomething out of it.

DEMOCRACY, the ſame with a popular government, wherein the ſupreme power is lodged in the hands of the people: ſuch were Rome and Athens of old; but as to our modern republics, Baſil only excepted, their government comes nearer to ariſtocracy than democracy.

DEMOISELLE, in ornithology, a bird of the crane-kind, ſomething leſs than a heron, known alſo by the name of the dancing bird, on account of its frequent leaping and turning round, and varying the motion of its head at the ſame time. Immediately from behind each eye, ſprings forth a tuft of long, ſoft, white feathers, which tend backwards in a very graceful manner, and wave with the leaſt air. The fore part of the neck, on the contrary, is covered with ſoft, long, and ſlender black feathers, which fall on the breaſt in a very pretty manner, ſometimes cloſe, and at other times detached like a lady's tippet.

DEMONSTRABLE, a term uſed in the ſchools, to ſignify that a thing may be clearly proved. Thus it is demonſtrable that the three angles of a triangle, are equal to two right ones.

DEMONSTRATION, in logic, a ſeries of ſyllogyſms, all whoſe premiſſes are either definitions, ſelf-evident truths, or propoſitions already eſtabliſhed.

The knowledge acquired by demonſtration, tho' it be certain, is not ſo clear and evident as intuitive knowledge. It requires pains and attention, and ſteady application of mind, to diſcover the agreement or diſagreement of the ideas it conſiders; and there muſt be a progreſſion by ſteps and degrees, before the mind can in this way arrive at certainty. Before demonſtration there was a doubt, which, in intuitive knowledge, cannot happen to the mind that has its faculty of perception left to a degree capable of diſtinct ideas. In every ſtep that reaſon makes in demonſtrative knowledge, there is an intuitive knowledge of that agreement or diſagreement it ſeeks with the next intermediate idea, which it uſes as a proof; for if it were not ſo, that yet would need a proof, ſince without the perception of ſuch agreement or diſagreement, there is no knowledge produced. This intuitive perception of the agreement or diſagreement of the intermediate ideas in each ſtep and progreſſion of the demonſtration, muſt be exactly carried in the mind; and a man muſt be ſure that no part is left out: hence becauſe in long deductions the memory cannot eaſily retain each ſtep, this knowledge becomes more imperfect than intuitive; and men often embrace falſhoods for demonſtrations. See KNOWLEDGE and INTUITION.

It has been generally taken for granted, that mathematics alone are capable of demonſtration. But to have ſuch an agreement or diſagreement as may be intuitively perceived being not the privilege of the ideas of number, extenſion and figure alone, it may poſſibly be the want of due method and application in us, and not of ſufficient evidence in things, that demonſtration has been thought to have ſo little to do in other parts of knowledge. For wherever the mind can perceive the agreement or diſagreement of any two ideas by an intuitive perception of the agreement or diſagreement they have with any intermediate ideas, there the mind is capable of demonſtration, which is not limited to the ideas of figure, number, extenſion, or their modes. There are two things required in right demonſtration, firſt, that every propoſition of which it conſiſts, conſidered ſeparately, be true. Secondly, that the conſequence drawn from other foreign things, neceſſarily flow from them; or that all the conſequences be contained in the antecedents or premiſes.

Demonſtration is diſtinguiſhed, 1. Into direct, called alſo oſtenſive demonſtration, when beginning with definitions, ſelf-evident propoſitions, or known and allowed truths, we form a train of ſyllogiſms, and combine them in an orderly manner, continuing the ſeries thro' a variety of ſucceſſive ſteps, until at laſt we arrive at a ſyllogiſm, whoſe concluſion is the propoſition to be demonſtrated. 2. Indirect, or, as it is ſometimes called, apogogical demonſtration, when we aſſume a propoſition which directly contradicts that we mean to demonſtrate; and thence by a continued train of reaſoning, in the way of a direct demonſtration, deduce ſome abſurdity or manifeſt untruth. For hereupon we conclude, that the propoſition aſſumed was falſe; and thence again, by an immediate conſequence, that the propoſition to be demonſtrated is true. Thus Euclid being to demonſtrate, *that circles which touch one another inwardly have not the ſame center*, aſſumes the direct contrary to this, *viz. that they have the ſame center*: and thence by an evident train of reaſoning proves, *that a part is equal to the whole*. The ſuppoſition, therefore, leading to this abſurdity he concludes to be falſe, *that circles touching one another inwardly have the ſame center*; and thence again immediately infers *that they have* *not the ſame center.* This is alſo called *reductio ad impoſſibile*, and *ad abſurdum*. 3. Geometrical demonſtration, that framed of reaſonings drawn from the elements of Euclid. 4. Mechanical demonſtration, that, the reaſonings of which are drawn from the rules of mechanics. 5. Demonſtration a priori, that by which the effect is demonſtrated from its cauſe either next or remote, as when we prove the exiſtence of light by the exiſtence of the ſun. 6. Demonſtration a poſteriori, when we demonſtrate the cauſe from the effect; as when from the exiſtence of light, we demonſtrate the exiſtence of the ſun.

The ſchoolmen make two kinds of demonſtration, the one διότι, or *propter quod*, in which an effect is proved by the next cauſe. As when it is proved that the moon is eclipſed, on account of the interpoſition of the earth between the ſun and moon. The other ὅτι, or *quia*, wherein the cauſe is proved from an effect, as, that fire is hot becauſe it burns; or when an effect is demonſtrated by a remote cauſe, as when it is proved that plants do not breathe, becauſe they are not animals,

DEMONSTRATIVE, in rhetoric, one of the kinds of eloquence, *viz.* that which obtains in the compoſition of panegyrics, invectives, &c. See the article RHETORIC.

DEMONSTRATIVE, in grammar, a term given to ſuch pronouns, as ſerve to indicate or point out a thing. Of this number are *hic*, *hæc*, *hoc*, among the Latins; and *this*, *that*, *theſe*, *thoſe*, in Engliſh. See the article PRONOUN.

DEMULCENTS, among phyſicians, medicines good againſt acrimonious humours. Such are the roots of marſh-mallows, of white lilies, of liquorice, and of viper graſs, the five emollient herbs, &c. See the article EMOLLIENTS.

DEMURRAGE, in commerce, an allowance made to the maſter of a ſhip by the merchants, for ſtaying in a port longer than the time firſt appointed for his departure.

DEMURRER, in law, a ſtop put to any action upon ſome point of difficulty which muſt be determined by the court, before any further proceedings can be had in the ſuit. Demurrers are either general, without ſhewing any particular cauſe; or ſpecial, where the cauſes of it are particularly aſſigned; and one may not pray the judgment of the court on an inſufficient declaration or plea, otherwiſe than by demurrer, when the matter comes judicially before them. In pleadings, if a matter is inſufficiently alledged, that the court cannot give judgment thereon, a general demurrer will ſuffice, and ſo for want of ſubſtance in any plea, &c. But if there be a want of form, it is required that there be a ſpecial demurrer.

DEMURRER *to evidence*, is where a queſtion of law ariſes thereon, as if the plaintiff in a ſuit gives in evidence any records, deeds, writings, &c. upon which a law queſtion ariſes, and the defendant offers to demur upon it, then the plaintiff muſt join in ſuch demurrer, or wave his evidence.

DEMURRER *to indictments*, is when a criminal joins iſſue upon a point of law in an indictment or appeal, allowing the fact as laid to be true. And if the indictment, or appeal, prove good in the opinion of the judges by whom the demurrer is to be tried, and not by the inqueſt, they proceed to judgment and execution, as if the party had been convicted by confeſſion or verdict.

DEN, a ſyllable which added to the names of places ſhews them to be ſituated in vallies or near woods, as Tenterden.

DEN and STROND, in law, was antiently a liberty for ſhips to run or come aſhore.

DENARIATE of LAND, *denariatus terræ*, in old law-books, ſignifies as much as was worth a penny by the year.

DENARIUS, in roman antiquity, the chief ſilver-coin among the Romans, worth in our money about ſeven-pence three farthings. As a weight, it was the ſeventh part of a roman ounce. See the articles COIN and WEIGHT.

DENARIUS DEI, GOD'S PENNY, denotes earneſt-money, and is ſo called becauſe in antient times it was given to the church or the poor.

DENARIUS *tertius comitatus*, a third part of the profits of county-courts. When theſe courts had ſuperior juriſdictions, before others were erected, two parts of the profits went to the king, and a third part to the earl of the county.

DENARII *de caritate*, were cuſtomary oblations made to cathedral churches charged upon pariſh prieſts, though at firſt they were but a gift of charity.

DENBY, the capital of Denbighſhire, in north Wales: weſt long. 3° 30′, and north lat. 53° 15′.

It ſends only one member to parliament.

DENDERMOND, a fortified town of Flanders, ſituated at the confluence of the rivers Scheld and Dender, twelve miles eaſt of Ghent: eaſt long. 3° 50′, and north lat. 51° 10′.

DENDRACHATES, in natural hiſtory, the name uſed by the antients for an extremely elegant and beautiful ſpecies of agat, the ground of which is whitiſh, variegated with veins of a brighter white. Theſe veins are beautifully diſpoſed in a number of various figures, but generally in many concentric irregular circles, drawn round one or more points. It is common alſo, in various parts of this ſtone, to find very beautiful delineations of trees, moſſes, ſea-plants, and the like, ſo elegantly expreſſed, that many have erroneouſly taken them for real plants included in the ſubſtance of the ſtone; whence the name dendrachates. See the article AGAT.

DENDRANATOMY, a term uſed by ſome for a deſcription of the various parts of trees, as root, trunk, branch, bark, wood, pith, flower, fruit, *&c.* See the articles ROOT, TRUNK, BRANCH, *&c.*

DENDROPHORIA, in antiquity, the carrying of boughs or branches of trees, a religious ceremony ſo called, becauſe certain prieſts called from thence dendrophori, tree-bearers, marched in proceſſion, carrying the branches of trees in their hands in honour of ſome god, as Bacchus, Cybele, Sylvanus, *&c.* The college of the dendrophori is often mentioned in antient marbles; and we frequently ſee in baſſo relievos the bacchanals repreſented as men carrying little ſhrubs or branches of trees.

Critics are at a loſs to aſſign the office of the dendrophori who attended the roman army. Some hold that they faſhioned the wood for the tents; others, that they provided the wood neceſſary for the machines of war; and others, that they were the ſame with the dendrophori of the feaſts and ſacrifices.

DENEB, an arabic term ſignifying tail, uſed by aſtronomers to denote ſeveral fixed ſtars. Thus deneb elecet, ſignifies the bright ſtar in the lion's tail. Deneb adigege, that in the ſwan's tail, *&c.*

DENIER, a ſmall french copper-coin, of which twelve make a ſol.

There were two kinds of deniers, the one tournois, the other pariſis, whereof the latter was worth a fourth part more than the former. See the article COIN.

DENIZEN, in law, an alien made a ſubject by the king's letters patent, otherwiſe called donaiſon, becauſe his legitimation proceeds *ex donatione regis*, from the king's gift. A denizen is enabled in ſeveral reſpects to act as natural ſubjects do, *viz.* to purchaſe and poſſeſs lands, and enjoy any office or dignity; yet it is ſhort of naturalization, for a ſtranger, when naturalized, may inherit lands by deſcent, which a denizen cannot do. If a denizen purchaſe lands, his iſſue that are born afterwards may inherit them, but thoſe he had before ſhall not; and as a denizen may purchaſe, ſo he may take lands by deviſe.

DENMARK, a kingdom ſituated between 8° and 13° of eaſt longitude, and between 54° and 58° of north latitude: it comprehends the peninſula of Jutland, and the iſlands of Zeland, Funen, *&c.* To the king of Denmark likewiſe belong Norway, Iceland, and the dutchy of Holſtein.

DENNIS, or St. DENNIS, a town of France four miles north of Paris, where the kings of France are interred.

DENOMINATION, a name impoſed on any thing, uſually expreſſing ſome predominant quality. Hence, as the qualities and forms of things are either internal or external, denomination becomes, 1. Internal, which is that founded on the intrinſic form. Thus Peter is denominated learned, on account of his learning, which is ſomething internal. 2. External denomination, that founded on an external form. Thus, a wall is ſaid to be ſeen and known, from the viſion and cognition employed upon it. And thus, Peter is denominated honoured by reaſon of honour, which is not ſo much in the perſon honoured, as in him who honours.

DENOMINATOR, in arithmetic, a term uſed in ſpeaking of fractions.

The denominator of a fraction is the number below the line, ſhewing into how many parts the integer is ſuppoſed to be divided. Thus in the fraction $\frac{3}{4}$, the number 4 ſhews that the integer is divided into four parts. So in the fraction $\frac{a}{b}$, b is the denominator. See the article FRACTION.

DENOMINATOR *of a ratio*, is the quotient ariſing from the diviſion of the antecedent by the conſequent. Thus 8 is the denominator of the ratio 40 : 5, becauſe 40 divided by 5, gives 8 for a quotient. It is alſo called the exponent of a ratio. See the article EXPONENT.

DE NON RESIDENTIA CLERICI REGIS, a writ that lies where a perſon is employed in the king's ſervice, in order to excuſe him of non-reſidence upon his living.

DENS, TOOTH, in anatomy. See the article TOOTH.

DENSHRING, or DEVENSHRING, in huſbandry. See DEVENSHRING.

DENSITY *of bodies*, is that property directly oppoſite to rarity, whereby they contain ſuch a quantity of matter under ſuch a bulk.

Accordingly, a body is ſaid to have double or triple the denſity of another body, when their bulk being equal, the quantity of matter is in the one double or triple the quantity of matter in the other. The denſities and bulks of bodies, are the two great points upon which all mechanics or laws of motion turn. It is an axiom that bodies of the ſame denſity contain equal maſſes under equal bulks. If the bulks of two bodies be equal, their denſities are as their maſſes: conſequently, the denſities of equal bodies are as their gravities. If two bodies have the ſame denſity, their maſſes are as their bulks; and as their gravity is as their maſſes, the gravity of bodies of the ſame denſity is in the ratio of their bulk. Hence alſo bodies of the ſame denſity are of the ſame ſpecific gravity; and bodies of different denſity, of different ſpecific gravity. The quantities of matter in two bodies, are in a ratio compounded of their denſity and bulk: conſequently their gravity is in the ſame ratio. If the maſſes or gravities of two bodies be equal, the denſities are reciprocally as their bulks. The denſities of any two bodies are in a ratio compounded of the direct ratio of their maſſes, and a reciprocal one of their bulks: conſequently ſince the gravity of bodies is as their maſſes, the denſities of bodies are in a ratio compounded of the direct ratio of their gravities, and a reciprocal one of their bulks. See the method of finding the ſpecific gravities, and conſequently the denſities, of both ſolid and fluid bodies, and likewiſe a table of the ſpecific gravities of bodies, under the articles HYDROSTATICAL BALLANCE, and *Specific* GRAVITY.

DENSITY *of the air*, is a property that has employed the later philoſophers ſince the diſcovery of the toricellian experiment.

It is demonſtrated, that in the ſame veſſel, or even in veſſels communicating with each other at the ſame diſtance from the center, the air has every where the ſame denſity. The denſity of the air, *cæteris paribus*, increaſes in proportion to the compreſſing powers. Hence the inferior air is denſer than the ſuperior; the denſity, however, of the lower air, is not proportional to the weight of the atmoſphere on account of heat and cold, and other cauſes perhaps which make great alterations in denſity and rarity. However, from the elaſticity of the air, its denſity muſt be always different at different heights from the earth's ſurface; for the lower parts being preſſed by the weight of thoſe above, will be made to accede nearer to each other, and the more ſo as the weight of the incumbent air is greater. Hence, the denſity of the air is greateſt at the earth's ſurface, and decreaſes upwards in geometrical proportion to the altitudes taken in arithmetical progreſſion.

If the air be rendered denſer, the weight of bodies in it is diminiſhed; if rarer, increaſed, becauſe bodies loſe a greater part of their weight in denſer than in rarer mediums. Hence, if the denſity of the air be ſenſibly altered, bodies equally heavy in a rarer air, if their ſpecific gravities be conſiderably different, will loſe their equilibrium in the denſer, and the ſpecifically heavier body will preponderate. See the articles AIR and CONDENSER.

DENSITY *of the planets*. In homogeneous, unequal ſpherical bodies, the gravities on their ſurfaces are as the diameters, if the denſities are equal. But if the bodies be equal, the gravities will be as the denſities. Therefore, in bodies of unequal bulks and denſities, the gravity will be in a compound ratio of the diameters and denſities. Conſequently, the denſities will be as the gravities divided by the diameters, and therefore in the ſeveral bodies as follows, *viz.*

In the Sun.	Jupiter.	Saturn.	Earth.	Moon.
10000.	9385.	6567.	39539.	48911.

As it is not likely that theſe bodies are homogeneal, the denſities here determined are not to be ſuppoſed the true, but rather the mean denſities, or ſuch as the bodies would have if they were homogeneal, and of the ſame maſs of matter, and magnitude.

DENTALIUM, in natural hiſtory, a ſimple ſhell having no hinge, and formed only of one piece: it is of a figure approaching to cylindric or conic, and is ſometimes crooked, ſometimes ſtraight; ſometimes

times cloſed at one end, ſometimes open at both.

The name dentalium has been given this ſhell, from the great reſemblance it has to the dentes canini of quadrupeds. There are ſeveral ſpecies of it, frequent on the ſhores of Italy, Portugal, *&c.* Among us, they are found foſſile in clay-pits, ſome ſmooth, ſome ſtriated; but in much greater abundance in the mountains of France and Italy. See plate LXIX. fig. 4.

The true officinal dentalium is one of the canales, or tubuli marini ſimplices, of authors: and the animal that inhabits it is of the genus of the nereis of Linnæus. See the article NEREIS.

Great things have been recorded of the virtues of the dentalium, but it has in reality no other than thoſe of an alkali or abſorbent, ſo that the readineſs of oyſter-ſhells has now put it out of uſe.

DENTARIA, TOOTHWORT, in botany, a genus of the tetradynamia-ſiliquoſa claſs of plants, the corolla of which is cruciform, and conſiſts of four roundiſh, obtuſe petals, ſlightly emarginated, plane, and ending in ungues of the length of the cup: the fruit is a long, roundiſh, bilocular pod, conſiſting of two valves: the ſeeds are numerous and roundiſh. See plate LXIX. fig. 6.

The root of this plant, the only part uſed in medicine, is accounted drying and aſtringent.

DENTATED LEAF, among botaniſts, one notched at the edges with a number of blunt points in ſome meaſure reſembling teeth. See the article LEAF.

DENTED, or INDENTED. See the article INDENTED.

DENTEX, in ichthyology, a ſpecies of ſparus, of a deep olive-brown colour, elegantly variegated with darker and paler ſpots: its back is acute or ridged, and it has four large teeth: it is a well taſted fiſh. See the article SPARUS.

DENTICLES, or DENTILS, in architecture, an ornament in corniches bearing ſome reſemblance to teeth, particularly uſed in the ionic and corinthian orders. They are cut on a little ſquare member, properly called denticulus, and the notches or ornaments themſelves, dentils. In antient times dentils were never uſed in the ionic corniche, yet they are found in the remains of the theatre of Marcellus, which ſome take for an argument that Vitruvius had not the direction of that building. Vitruvius preſcribes the breadth of each dentil to be half its height, and the indenture or interval between each two, he directs to be two thirds of the breadth of the dentil.

DENTIFORM PROCESS, in anatomy, See the article PYRENOIDES.

DENTIFRICE, in medicine, a remedy for rubbing the teeth, and purging them from ſordes; and for cleanſing and abſterging the gums, when replete with humours. There are dentifrices of various kinds and forms, ſome in form of a powder compoſed of corals, pumice-ſtone, ſalt, allum, egg-ſhells, crabs-claws, hartſhorn, *&c.* others in form of an electuary, conſiſting of the ſame powders mixt up with honey; others are in form of a liquor drawn by diſtillations from drying herbs, and aſtringent medicines, *&c.*

The generality of operators for the teeth allow acids, ſuch as ſpirit of vitriol, *&c.* to be the readieſt of all dentifrices, to take off the foulneſs and yellowneſs of the teeth: but yet, they don't adviſe a frequent uſe of theſe remedies, as they wear away too much of the teeth and injure the gums.

The Dutch account butter the beſt dentifrice for keeping the teeth white and ſound, and the Spaniards hold urine to be good for that purpoſe.

DENTILS, in architecture, the ſame with denticles. See the article DENTICLES.

DENTISCALPRA, in ſurgery, an inſtrument for ſcouring yellow, livid, or black, teeth; to which being applied, near the gums, it ſcrapes off the foul, morbid cruſt.

Some of theſe inſtruments are furniſhed with narrow points; others with broader, and with edges; and ſome again are falciform; but all of them adapted to one and the ſame handle.

DENTITION, the breeding, or cutting, the teeth in children.

Among all the diſorders which afflict children, there are none generate ſuch grievous ſymptoms as difficult dentition. About five or ſix months after birth, the teeth generally begin to make their appearance: firſt, the inciſores, or foreteeth; next, the canini, or dog teeth; and, laſtly, the molares, or grinders. About the ſeventh year there comes a new ſet; and at twenty one the two inner grinders, called *dentes ſapientiæ*, or teeth of wiſdom. At the time of cutting their teeth, they ſlaver very much, and have a diarrhœa, which is no bad ſign:

but when it is difficult, eſpecially when the canine teeth begin to be in motion, and make their way out through the gums, the child has ſtartings in his ſleep, tumours of the gums, gripes, a looſeneſs or coſtiveneſs, greeniſh ſtools, the thruſh, fevers, difficult breathing, ſuffocating catarrhs, convulſions, epilepſies, which often end in death.

It ſhews the dentition is like to be bad, if the child is perpetually crying, thruſts his finger into his mouth, and bites the nurſe's nipples; if unequal tubercles are perceived in the gums, where the teeth are expected to appear; if there is a heat in the mouth, and the whole body; if they ſtart without a cauſe, eſpecially in ſleep.

Harris obſerves, that when an inflammation appears, the phyſicians will labour in vain, if the cure is not begun by applying a leech under each ear. When the ſwelling of the gum ſhews it is time to cut it, to make way for the tooth, he would have it done with a pen-knife, not with a fine lancet, leſt the wound ſhould heal, and form a cicatrix. The food he directs to be no more that lukewarm.

Heiſter adviſes internally aqueous mixtures, temperating powders; externally, oil of ſweet almonds, with ſpirit of violets, or ſpirit of wild poppies, lightly acidulated with ſpirit of vitriol, wherewith often to rub the gums; as alſo with the coral, or other ſmooth thing, which will have the ſame effect. Some reckon the freſh blood of a cock's comb a ſpecific for this purpoſe. Morgan affirms, in this caſe, it will be beſt to abate the effervefcence of the blood with diluters; to appeaſe the pain with gentle opiates; to open the body with purges and clyſters; to draw off the fermented ſerum by bliſters; to promote the cutting of the teeth by cooling, relaxing, and opening the gums: for this purpoſe diacodium is good, or a ſtrong decoction of marſhmallows and poppy-heads, in thick milk, cream, or neats-foot oil.

Sydenham obſerves, that pains in dentition often produce fevers: for which he could find no remedy ſo effectual as three or four drops of ſpirit of hartſhorn in a ſpoonful of ſimple water, or other convenient vehicle, given every four hours: the number of doſes may be four, five, or ſix.

DENUNCIATION, a ſolemn publication or promulgation of any thing. All veſſels of enemies are lawful prize; after denunciation or proclamation of war. The deſign of the denunciation of excommunicated perſons, is that the ſentence may be the more fully executed by the perſon's being more known.

DEOBSTRUENTS, in pharmacy, ſuch medicines as open obſtructions. See the article DETERGENT.

There is ſomewhat further expreſſed in the term deobſtruent than in detergent, for a medicine may be deobſtruent that is not, in the ſtricteſt ſenſe, detergent; as are moſt metalline ſubſtances, as ſteel and mercury, which obtain the appellation deobſtruents, from their acting by their natural weight, whereby they increaſe the momentum of the circulating fluids, and with greater force make it ſtrike againſt the ſecretory outlets: becauſe the momenta, or vis percuſſionis, of all projectiles, of which kind is a circulating fluid, is as their ſolidities, ſuppoſing their velocities equal. The more, therefore, the animal fluids are ſaturated with denſe and ſolid particles, with the greater force they diſtend the veſſels, and the more eaſily break through, where the ſtructure favours their eſcape; and upon that account are medicines, which add to theſe qualities in the fluid, called deobſtruents.

DEODAND, in our cuſtoms, implies a thing devoted or conſecrated to God, for the pacification of his wrath, in caſe of any misfortune, as a perſon's coming to a violent end, without the fault of any reaſonable creature; as if a horſe ſhould ſtrike his keeper, and ſo kill him. In this caſe, the horſe is to be a deodand; that is, he is to be ſold, and the price diſtributed to the poor, as an expiation of that dreadful event.

DE ONERANDO PRO RATA PORTIONIS, in law, a writ that lies where a perſon is deſtrained for rent, which ought to be paid by others in proportion with him; as where one holds twenty acres of land by fealty, at a certain rent, and aliens one acre to one perſon, and another to another: here, if one of the alienees be diſtrained for the whole, or more rent than the value of what he purchaſed, he then may have this writ.

DEOPPILATIVES, in pharmacy, the ſame with deobſtruents. See the article DEOBSTRUENTS.

DEPART, in chemiſtry, a method of refining

fining, or ſeparating gold from ſilver, by means of aquafortis, generally called quartation.

For the operation of the depart, ſee the articles ASSAYING and QUARTATION.

DEPARTURE, in law, ſignifies a departing or going from a plea given in bar of an action. It is likewiſe uſed where a plaintiff in his declaration ſets forth one thing, and after the defendant has pleaded thereto, he in his replication ſhews new matter different from his declaration.

If a perſon pleads a general agreement in bar, and alledges a ſpecial one in his rejoinder, this will be a departure in pleading: ſo, where an action is brought at common law, and the plaintiff, by his replication, endeavours to maintain it by cuſtom. It will alſo be accounted a departure, if, after performance is pleaded in debt upon hand, the defendant ſays any other thing, by way of excuſe, *&c.* But in circumſtances of time, &c. laid as to promiſes, if the defendant by his plea force the plaintiff to vary, it is no departure: for the plaintiff is not tied to a preciſe day.

DEPARTURE *in deſpite of the court*, is where a tenant or defendant appears to an action brought againſt him, and having a day over in the ſame term, does not appear at the day, but makes a default. This is a departure in deſpite of the court, and therefore he ſhall be condemned.

DEPARTURE, in navigation, is the eaſting or weſting of a ſhip in reſpect of the meridian it departed or ſailed from: or it is the difference of longitude, either eaſt or weſt, between the preſent meridian the ſhip is under, and that where the laſt reckoning or obſervation was made. This departure, any where but under the equator, muſt be accounted according to the number of miles in a degree, proper to the parallel the ſhip is under.

DEPHLEGMATED, an appellation given to ſpirits well freed from phlegm. See the next article.

DEPHLEGMATION, in chemiſtry, the ſame as rectification, or the freeing a ſpirit from its phlegm, either by diſtillation, or ſome other means.

DEPILATORY MEDICINES, thoſe applied in order to take off the hair: ſuch are lime and orpiment known to be, but theſe ought to be uſed with great caution.

DEPONENT, in latin grammar, a term applied to verbs, which have active ſignifications, but paſſive terminations or conjugations, and want one of their participles paſſive.

DEPONENT, in the law of Scotland, a perſon who makes a depoſition. See the article DEPOSITION.

DEPOPULATION, the act of committing waſte. See the article WASTE.

DEPORTATION, a ſort of baniſhment uſed by the Romans, whereby ſome iſland or other place was allotted to a criminal for the place of his abode, with a prohibition not to ſtir out of the ſame on pain of death.

DEPOSIT, among civilians, ſomething that is committed to the cuſtody of a perſon, to be kept without any reward, and to be returned again on demand.

Depoſit is diſtinguiſhed into ſimple and judiciary.

Simple DEPOSIT is either voluntary or neceſſary: neceſſary, is that done in caſe of hoſtility, ſhipwreck, fire, *&c.*

Judiciary DEPOSIT is that whoſe property is conteſted by ſeveral perſons, and depoſited in the cuſtody of ſome third perſon, by order of a judge.

DEPOSITARY, in the french law, a perſon intruſted as keeper or guardian of a depoſit. See the preceding article.

Ordinary depoſitaries are not to warrant the thing left with them, in caſe it be loſt or ſtolen, they are only to anſwer for fraud or the like.

DEPOSITION, in law, the teſtimony given in court by a witneſs, upon oath.

In chancery, depoſition is a teſtimony ſet down in writing, by way of anſwer to the interrogations exhibited in chancery, where ſuch witneſs is called deponent. Depoſitions in one cauſe may be uſed at the hearing of another, where they are between the ſame parties, *&c.* without any motion: this is not permitted in other courts, without a ſpecial order of the court of chancery. The depoſitions in chancery, after the cauſe is determined there, may be given in evidence in a trial at bar, in any of the other courts.

DEPOSITION alſo ſignifies the ſequeſtring or depriving a man of ſome dignity and office.

DEPRECATION, in rhetoric, a figure whereby the orator invokes the aid and aſſiſtance of ſome one; or prays for ſome great evil or puniſhment to befal him who ſpeaks falſely, either himſelf or his adverſary.

DEPRECATORY, or **DEPRECATIVE**, in theology, a term applied to the manner of performing ſome ceremonies in the form of prayer.

The form of abſolution is deprecative in the greek church, being conceived in theſe terms, *May God abſolve you:* whereas it is in the declarative form in the latin church, and in ſome of the reformed churches, *I abſolve you.*

DEPRESSION *of equations.* See the article EQUATION.

DEPRESSION *of the pole.* When a perſon ſails or travels towards the equator, he is ſaid to depreſs the pole, becauſe as many degrees as he approaches nearer the equator, ſo many degrees will the pole be nearer the horizon. This phænomenon ariſes from the ſpherical figure of the earth. See the articles EARTH and POLE.

When a ſtar is under the horizon, it is termed the depreſſion of that ſtar under the horizon. The altitude or depreſſion of any ſtar is an arch of the vertical intercepted between the horizon and that ſtar. See the articles HORIZON and VERTICAL.

DEPRESSOR, or **DEPRIMENS**, in anatomy, a name applied to ſeveral muſcles, becauſe they depreſs the parts they are faſtened to.

DEPRESSOR LABII INFERIORIS, or QUADRATUS, is a muſcle conſiſting of ſome thin fleſhy fibres, which lie immediately under the ſkin of the chin; they ariſe from the edge of the fore-part of the whole under-jaw, and are inſerted in the lower-part of the orbicularis.

DEPRESSOR LABII SUPERIORIS, or TRIANGULARIS, is a muſcle that ariſes from the lower-edge of the under jaw, between the maſſeter and quadratus, and aſcends by the angle of the mouth to the upper-jaw. Theſe two muſcles acting together, expreſs a ſorrowful countenance, becauſe they draw downwards the corners of the mouth and cheeks.

DEPRESSORES NASI, are a pair of muſcles ariſing from the os maxillare, above the dentes inciſores; and are inſerted into the extremities of the alæ, which they pull downwards.

DEPRESSOR ANGULI ORIS, a name given by Albinus to the muſcle called by others depreſſor labiorum communis. See the article DEPRESSOR LABII.

DEPRESSORES OCULI, a pair of muſcles ſpringing from each corner of the eye, and anſwered by another pair of the like figure and ſtructure, in the lower eyelid. See the article EYE.

DEPRIMENS, the ſame with depreſſor. See the preceding article.

DEPRIVATION, in the canon-law, the depoſing a biſhop, parſon, vicar, *&c.* from his office and preferment.

There are two ſorts of deprivation, the one *a beneficio*, the other *ab officio:* the deprivation *a beneficio*, is when, for ſome great crime a miniſter is wholly deprived of his benefice. A deprivation *ab officio*, is when a miniſter is for ever deprived of his orders, which is is alſo called depoſition or degradation: this is generally for ſome heinous crime deſerving death, and is performed by the biſhop.

DEPTFORD, a town three miles eaſt of London, on the ſouthern banks of the Thames; chiefly conſiderable for its fine docks for building ſhips, and the king's yard.

DEPTH, in geometry, the ſame with altitude; though, ſtrictly ſpeaking, we only uſe the term depth to denote how much one body, or part of a body, is below another. See the articles ALTITUDE, HEIGHT, *&c.*

DEPTH *of a battalion, ſquadron, &c.* the number of men in a file, who ſtand before each other in a ſtraight line. In the antient armies this was very great.

DEPURATION, the ſame with clarification. See the article CLARIFICATION.

DEPURATORY FEVER, a name given by Sydenham to a fever which prevailed much in the years 1661, 1662, 1663, and 1664. He called it depuratory, becauſe he obſerved that nature regulated all the ſymptoms in ſuch a manner, as to fit the febrile matter, prepared by proper concoction, for expulſion in a certain time, either by a copious ſweat, or a freer perſpiration.

DEPUTATION, a miſſion of ſelect perſons out of a company, or body, to a prince or aſſembly, to treat of matters in their name. They are more or leſs ſolemn, according to the quality of thoſe who ſend them, and the buſineſs they are ſent upon.

DEPUTY, a perſon ſent upon ſome buſineſs, by ſome community.

DEPUTY is alſo one who exerciſes an office in another's right; and the forfeiture or miſdemeanor of ſuch deputy ſhall cauſe the perſon, whom he repreſents, to loſe his office. A principal officer may not appoint his deputy in all caſes, unleſs the grant of the office will juſtify him in ſo doing; but when an office deſcends to an infant, he may make a deputy of courſe. Judges have no power to hold their courts by deputy: recorders, however, may do it. It is held a coroner cannot appoint a deputy, it being a judicial office of truſt, annexed to the perſon. And if the office of parkerſhip be granted to one, he cannot depute another, becauſe it is an office of truſt and confidence.

DEPUTATUS, among the antients, a name applied to perſons employed in making of armour: and likewiſe to briſk active people, whoſe buſineſs was to take care of the wounded in engagements, and carry them off the field.

DEPUTATUS, δεπȣτάτος, in the greek church, an inferior officer, like an uſher, who in proceſſions kept the crowd off the patriarch.

DEREHAM, a market-town of Norfolk, about fifteen miles weſt of Norwich: eaſt long. 1°, and north lat. 52° 40′.

DERELICTS, in the civil law, ſuch goods as are wilfully relinquiſhed by the owner. It alſo ſignifies a thing forſaken, or caſt away by the ſea.

DERIVATION, in medicine, is when a humour, which cannot be conveniently evacuated at the part affected, is attracted from thence, and diſcharged at ſome more proper place in its vicinity; or is drawn from a noble, to a more ignoble part, where it is leſs capable of doing injury. Thus a bliſter is applied upon the neck to draw thither the matter, in caſes of defluxions upon the eyes.

DERIVATIVE, in grammar, a word which is derived from another called its primitive. See the article PRIMITIVE.

Thus *manhood* is derived from *man*, *deity* from *deus*, and *lawyer* from *law*.

DERMA, in anatomy, the ſame with cutis. See the article CUTIS.

DERMESTES, in zoology, a genus of inſects of the order of the coleopteræ, the antennæ of which are of a clavated figure and perfoliated tranſverſly.

There are a great many ſpecies of this genus, confounded by ſome with beetles. See plate LXIX. fig. 2.

DERNIER RESSORT. See RESSORT.

DEROGATION, in the french law, an act which annuls a preceding one, either in whole, or in part. In general terms, they are not regarded in judicature; they muſt be in ſpecific, and in formal terms.

DEROGATORY, a clauſe importing derogation. A derogatory clauſe in a teſtament, is a certain ſentence, cypher, or ſecret character, which the teſtator inſerts in his will, and of which he reſerves the knowledge to himſelf alone, adding a condition that no will he may make hereafter is to be reckoned valid, if this derogatory clauſe is not inſerted expreſly, and word for word. It is a precaution invented by lawyers againſt later wills extorted by violence, or obtained by ſuggeſtion.

DERVIS, a name given to all mahommedan monks, though of various orders. The moſt noted among them are the bektaſhi, the mevelevi, the kadri, and the ſeyah. The bektaſhi, who are allowed to marry and live in cities and towns, are obliged, by the rules of their order, to viſit remote lands, and to ſalute every one they meet with *gazel*, or love-ſongs, and with *eſma*, or the invocation of the names of God, and humbly to wiſh him proſperity, which they do by repeating the word *eivallah*, a ſolemn exclamation of the wreſtlers, by which the conquered yields the palm to the conqueror. The mevelevi, ſo called from Mevelava their founder, are uſed to turn round for two or three hours together, with ſuch ſwiftneſs that you cannot ſee their faces; they are great lovers of muſic: in their monaſteries they profeſs great humility and poverty, and when viſited make no diſtinction of perſons; they firſt bring their gueſts coffee to drink; and, if the ways have been dirty, they waſh their feet and ſandals. The kadri, with a peculiar ſuperſtition, emaciate their bodies; they go quite naked, except their thighs, and often join hands and dance, ſometimes a whole day, repeating with great vehemence, *hu! hu! hu!* (one of the names of God) till, like madmen, they fall on the ground, foaming at the mouth, and running down with ſweat: the prime vizir Kupruli Achmed Paſha, thinking this ſect unbecoming the mahommedan religion, ordered it to be ſuppreſſed; but, after his death, it revived, and is at preſent more numerous than ever, eſpecially at Conſtantinople,

nople. The ſeyah are wanderers, and though they have monaſteries, yet they often ſpend their whole life in travelling; when they are ſent out, their ſuperiors impoſe upon them ſuch a quantity of money or proviſions, forbidding them to come back till they have procured it, and ſent it to the monaſtery; wherefore when a ſeyah comes into a town, he cries aloud in the market-place, *Ya allah ſenden, &c. O God! give me, I pray, five thouſand crowns*, or *a thouſand meaſures of rice*. Many of theſe derviſes travel over the whole mahommedan world, entertaining the people wherever they come, with agreeable relations of all the curioſities they have met with. There are derviſes in Egypt, who live with their families, and exerciſe their trades, of which kind are the dancing derviſes at Damaſcus. They are all diſtinguiſhed among themſelves by the different forms and colours of their habits; thoſe of Perſia wear blue; the ſolitaries and wanderers wear only rags of different colours; others carry on their heads a plume made of the feathers of a cock; and thoſe of Egypt wear an octagonal badge of a greeniſh white alabaſter at their girdles, and a high ſtiff cap, without any thing round it.

DERWENT, a river, which taking its riſe in the north riding of Yorkſhire, runs ſouth, and falls into the Ouſe.

DERWENT-WATER, a river of Cumberland, which falls into the iriſh ſea below Cockermouth.

DESART, a large extent of country entirely barren, and producing nothing. In this ſenſe ſome are ſandy deſarts, as thoſe of Lop, Xamo, Arabia, and ſeveral others, in Aſia; in Africa, thoſe of Lybia and Zara: others are ſtony, as the deſart of Pharan in Arabia Petrea.

The DESART, abſolutely ſo called, is that part of Arabia ſouth of the holy land, where the children of Iſrael wandered forty years.

DESCANT, in muſic, the art of compoſing in ſeveral parts. See COMPOSITION.

Deſcant is threefold, *viz.* plain, figurative, and double.

Plain DESCANT is the ground-work and foundation of all muſical compoſitions, conſiſting altogether in the orderly placing of many concords, anſwering to ſimple counter-point. See COUNTER-POINT.

Figurative or *florid* DESCANT, is that part of an air of muſic, wherein ſome diſcords are concerned, as well, though not ſo much, as concords. This may be termed the ornamental and rhetorical part of muſic, in regard that there are introduced all the varieties of points, ſyncopes, diverſities of meaſures, and whatever is capable of adorning the compoſition.

DESCANT *double*, is when the parts are ſo contrived, that the treble, or any high part, may be made the baſs; and, on the contrary, the baſs the treble.

DESCENDANT, in genealogy, a term relative to aſcendant, and applied to a perſon who is born or iſſued from ſome other referred to: thus mankind are ſaid to be the deſcendants of Adam. See the article DESCENT.

DESCENSION, or DESCENDING, in general, ſignifies much the ſame with deſcent. See the article DESCENT.

DESCENSION, in aſtronomy, is either right or oblique.

Right DESCENSION is an arch of the equinoctial, intercepted between the next equinoctial point and the interſection of the meridian, paſſing thro' the center of the object, at its ſetting, in a right ſphere.

Oblique DESCENSION, an arch of the equinoctial intercepted between the next equinoctial point and the horizon, paſſing through the center of the object, at its ſetting, in an oblique ſphere.

DESCENSIONAL, ſomething belonging to deſcenſion. See DESCENSION.

DESCENTIONAL DIFFERENCE, that between the right and oblique deſcenſion of any heavenly body. See DESCENSION.

DESCENT, in general, is the tendency of a body from a higher to a lower place; thus all bodies, unleſs otherwiſe determined by a force ſuperior to their gravity, deſcend towards the center of the earth: the planets too may be ſaid to deſcend from their aphelion to the perihelion of their orbits, as the moon does from the apogee to the perigee.

Heavy bodies, meeting with no reſiſtance deſcend with an uniformly accelerated motion, for the laws of which ſee the article ACCELERATION.

Laws of the DESCENT *of bodies.* 1. All bodies near the ſurface of the earth deſcend perpendicularly at the rate of ſixteen feet one inch in a ſecond of time. 2. The velocity of a body deſcending in an inclined plane, at the end of any given time, is to the velocity that it would acquire by deſcending perpendicularly in the ſame time, as the altitude of the inclined plane is to its length. 3. The laſt velocity acquired by the direct deſcent, is to the laſt velocity acquired in the ſame time by the oblique deſcent, as the abſolute gravity is to the relative gravity of the deſcending body. 4. The line deſcribed by the direct deſcent, is to the line deſcribed in the ſame time by the oblique deſcent, as the length of the oblique plane is to its height. 5. If the line deſcribed by the direct deſcent be to the line deſcribed by the oblique deſcent, as the height of the inclined plane to its length, then the times of deſcent ſhall alſo be in the ſame proportion, and the laſt velocities equal. 6. The laſt velocities acquired upon ſeveral inclined planes of the ſame height, however different in length, are equal. 7. The time of oblique deſcent thro' any chord of a circle, drawn from its loweſt point, is equal to the time of a direct deſcent thro' the diameter of that circle. 8. The laſt acquired velocities of a body, deſcending to the loweſt point of a given circle, through different chords, are as thoſe chords. 9. The time of the deſcent of a body in any arch of a ſemicycloid, is equal to the time of its deſcent through any other arch, whether longer or ſhorter, of the ſame curve. 10. A body will deſcend ſooner along an arch of a cycloid, than along that of any other curve, drawn between the ſame points. 11. If water runs out through a hole made in the bottom of a parabolic conoid, the ſurface of the water will deſcend equal ſpaces in equal times. 12. A body deſcends in a reſiſting medium with a force only equal to the exceſs of its gravity above that of an equal bulk of the medium. 13. If a body be thrown downwards, in a reſiſting medium, with ſuch a force as ſhall make the reſiſtance of the medium equal to the acceleration of gravity, it will afterwards deſcend with an uniform motion. 14. If a body deſcends through any number of inclined planes, it will acquire the ſame velocity at the end of its fall, as though it had fallen through a plane equal in height to the whole, and of the ſame inclination with the laſt of them.

Descent, or **Discent**, in law, an order or method whereby lands or tenements are derived to any man from his anceſtors.

It is either by the common law, cuſtom, or ſtatute. By the common law, as where a perſon has lands of inheritance in fee, and dies without having made any diſpoſal thereof: wherefore the land deſcends and goes in courſe to the eldeſt ſon and heir. By cuſtom, as where the lands ſometimes deſcend to all the ſons; or to all the brothers, where one brother dies without iſſue, as in gavel-kind, *&c.* And deſcent by ſtatute is a deſcent in fee-tail, as directed by the manner of the limitation or ſettlement, purſuant to ſtat. Weſtm. 2. and 13 Ed. I.

Deſcent, at common law, is either lineal or collateral.

Lineal deſcent is that conveyed down in a right line from the grand-father to the father, from the father to the ſon, and from the ſon to the grand-ſon. Collateral deſcent is that ſpringing out of the ſide of the line, or blood, as from a man to his brother, nephew, or the like.

Descent, in genealogy, the order or ſucceſſion of deſcendants in a line or family; or their diſtance from a common progenitor: thus we ſay, one deſcent, two deſcents, *&c.* See Extraction.

Descent, in heraldry, is uſed to expreſs the coming down of any thing from above; as, a lion en deſcent, is a lion with his head towards the baſe points, and his heels towards one of the corners of the chief, as if he were leaping down from ſome high place.

Descent, in fortification, are the holes, vaults, and hollow places made by undermining the ground.

The deſcent into the moat or ditch is a deep paſſage made through the eſplanade and covert-way, in form of a trench, whereof the upper part is covered with madriers and clays, to ſecure the beſiegers from the enemy's fire. In wet ditches this trench is on a level with the ſurface of the water, but in dry ones it is ſunk as deep as the bottom of the ditch.

DESCRIBENT, in geometry, a line or ſurface, which, by its motion, deſcribes a ſurface or ſolid.

DESCRIPTION is ſuch a ſtrong and beautiful repreſentation of a thing, as gives the reader a diſtinct view and ſatisfactory notion of it.

Deſcriptions are almoſt peculiar to poetry: hiſtorians indeed deſcribe things, places, and perſons; but not ſo much for the ſake of ornament, as of neceſſity. Orators likewiſe attempt deſcriptions when they have a mind to work upon the paſſions; but neither the one nor the other uſe them as decorations to their writings, which poets generally do, very ſucceſsfully, not only with a deſign to move the paſſions, but to pleaſe the fancy. Great judgment is required in the due exerciſe of this art. A judicious author will omit low and vulgar circumſtances, and chiefly beſtow his pains to complete all the eſſential and maſterly ſtrokes, cutting off all ſuperfluities, and rejecting the moſt pleaſing thought and florid lines, when foreign to his ſubject: many things muſt be left to the imagination of the reader, and ſeaſonable ſilence has its emphaſis; thus Virgil tells us, Georg. iv. 457. that Eurydice was killed by a monſtrous ſerpent, lurking in a bank; but ſays nothing more of that venemous creature. A poetaſter would probably have ſpent as many lines in the deſcription of it, as compoſed that admirable poem. The deſcription of a perſon is called a character, in drawing which the true proof of art and judgment is to hit a beautiful likeneſs, and, with a delicate touch, to give thoſe features and colours which are peculiar to the perſon, and diſtinguiſh him from the reſt of mankind. In every good and lively deſcription, a man muſt come to an enumeration of the chief particulars; for generals are often obſcure and faint. A judicious author, by ſetting every thing in full view, makes a ſtrong and laſting impreſſion on the reader.

DESEADA, or Desiderada, one of the Caribbee-iſlands, lying eaſtward of Guadaloupe.

DESERTER, in a military ſenſe, a ſoldier who, by running away from his regiment or company, abandons the ſervice

A deſerter is, by the articles of war, puniſhable by death, and, after conviction, is hanged at the head of the regiment he formerly belonged to, with his crime writ on his breaſt, and ſuffered to hang till the army leave that camp, for a terror to others.

DESHACHE', in heraldry, is where a beaſt has its limbs ſeparated from its body, ſo that they ſtill remain on the eſcutcheon, with only a ſmall ſeparation from their natural places

DESIDERATUM is uſed to ſignify the deſirable perfections in any art or ſcience: thus, it is a deſideratum with the blackſmith, to render iron fuſible by a gentle heat, and yet preſerve it hard enough for ordinary uſes; with the glaſsman and looking-glaſs maker, to render glaſs malleable; with the clock-maker, to bring pendulums to be uſeful, where there are irregular motions; with the braſier and copperſmith, to make malleable ſolder; with the ſhipwright, to build veſſels that will ſail under water; with the diver, to procure manageable inſtruments for conveying freſh air to the bottom of the ſea, ſufficient for reſpiration and the burning of lights; with the aſſay-maſter, to melt or copel ores or metals immediately, without the uſe of bellows or furnaces; and with the carvers and joiners, to faſhion wood in moulds like plaiſter of paris, or burnt alabaſter, &c. And though, as Mr. Boyle obſerves, the obtaining of theſe deſiderata may be thought chimeral, yet it is proper they ſhould be propoſed; for, although perfection may not be attainable, yet approaches to it may be made, and arts thereby improved. To this may be added, that the making of iron malleable, with pit-coal was once looked upon as chimerical, yet it is now put in practice, to the great advantage of the owners of ſeveral mines in this kingdom.

All arts have their defects; and it is not at firſt to be gueſſed, for how many of theſe remedies may be found, by means of chemical reſearches, properly directed. Chemiſtry itſelf is greatly defective in many particulars, as in an experimental hiſtory of general fermentation, ſeparatory and combinatory; in ſubjects of the animal, vegetable, and mineral kingdoms. The ſchemes for new trades will riſe occaſionally in proſecuting many of the ſubjects; thus it is natural for the common operations of brewing and ſugar-baking, to ſuggeſt that ſugar may be procured from malt and other vegetables. That nurſeries of peculiar ferments, both native and foreign, may be raiſed on the common principles; and it is evident that the introduction of ſuch new trades would greatly improve the buſineſs of brewing, ſugar-baking, and the like.

DESIGN, in a general ſenſe, the plan, order, repreſentation, or conſtruction of a building, book, painting, &c.

In building, the term ichnography may be uſed, when by deſign is only meant the plan of a building, or a flat figure drawn on paper: when ſome ſide or face of the building is raiſed from the ground, we may uſe the term orthography; and when both front and ſides are ſeen, in perſpective, we may call it ſcenography. See

Ichnography, Orthography, and Scenography.

Design, in the manufactories, expreſſes the figures wherewith the workman enriches his ſtuff, or ſilk, and which he copies after ſome painter, or eminent draughts-man, as in diaper, damaſk, and other flowered ſilk and tapeſtry, and the like.

In undertaking of ſuch kinds of figured ſtuffs, it is neceſſary, ſays Monſ. Savary, that, before the firſt ſtroke of the ſhuttle, the whole deſign be repreſented on the threads of the warp; we do not mean in colours, but with an infinite number of little packthreads, which, being diſpoſed ſo as to raiſe the threads of the warp, let the workmen ſee, from time to time, what kind of ſilk is to be put in the eye of the ſhuttle, for woof. This method of preparing the work is called reading the deſign, and reading the figure, which is performed in the following manner: a paper is provided, conſiderably broader than the ſtuff, and of a length proportionate to what is intended to be repreſented thereon. This they divide lengthwiſe, by as many black lines as there are intended threads in the warp; and croſs theſe lines, by others drawn breadthwiſe, which, with the former, make little equal ſquares: on the paper thus ſquared, the draughts-man deſigns his figures, and heightens them with colours, as he ſees fit. When the deſign is finiſhed, a workman reads it, while another lays it on the ſimblot.

To read the deſign, is to tell the perſon who manages the loom, the number of ſquares, or threads, compriſed in the ſpace he is reading, intimating at the ſame time whether it is ground or figure.

To put what is read on the ſimblot, is to faſten little ſtrings to the ſeveral packthreads, which are to raiſe the threads named; and thus they continue to do till the whole deſign is read.

Every piece being compoſed of ſeveral repetitions of the ſame deſign, when the whole deſign is drawn, the drawer, to re-begin the deſign afreſh, has nothing to do but to raiſe the little ſtrings, with ſlip-knots, to the top of the ſimblot, which he had let down to the bottom: this he is to repeat as often as is neceſſary till the whole be manufactured.

The ribbon-weavers have likewiſe a deſign, but far more ſimple than that now deſcribed. It is drawn on paper with lines and ſquares, repreſenting the threads of the warp and woof. But inſtead of lines, whereof the figures of the former conſiſt, theſe are conſtituted of points only, or dots, placed in certain of the little ſquares, formed by the interſection of the lines. Theſe points mark the threads of the warp that are to be raiſed, and the ſpaces left blank denote the threads that are to keep their ſituation: the reſt is managed as in the former.

Design is alſo uſed, in painting, for the firſt idea of a large work, drawn roughly, and in little, with an intention to be executed and finiſhed in large. The art of painting has been by ſome of the greateſt maſters divided into the deſign, or draught, the proportion, the expreſſion, the claro-obſcuro, the ordonnance, the colouring, and the perſpective.

Deſign, in painting, is the ſimple contour, or outlines of the figures intended to be repreſented, or the lines that terminate and circumſcribe them: ſuch deſign is ſometimes drawn in crayons, or ink, without any ſhadows at all; ſometimes it is hatched, that is, the ſhadows are expreſſed by ſenſible outlines, uſually drawn acroſs each other with the pen, crayon, or graver. Sometimes, again, the ſhadows are done with the crayon rubbed ſo as that there do not appear any lines: at other times, the grains or ſtrokes of the crayon appear, as not being rubbed: ſometimes the deſign is waſhed, that is, the ſhadows are done with a pencil in indian ink, or ſome other liquor; and ſometimes the deſign is coloured, that is, colours are laid on much like thoſe intended for the grand work.

The eſſential requiſites of a deſign are correctneſs, good taſte, elegance, character, diverſity, expreſſion, and perſpective. Correctneſs depends on the juſtneſs of the proportions, and knowledge of anatomy. Taſte is a certain manner of correctneſs peculiar to one's ſelf, derived either from nature, maſters, or ſtudies, or all of them united. Elegance gives a delicacy that not only ſtrikes perſons of judgment, but communicates an agreeableneſs that pleaſes univerſally. The character is what is peculiar to each thing, wherein there muſt be diverſity, inſomuch that every thing has its peculiar character to diſtinguiſh it. The expreſſion is the repreſentation of an object, according to the circumſtances it is ſuppoſed to be in. Perſpective is the repreſentation of the parts of a painting, or a figure, according to the ſituation they are in with regard to the point of ſight. The deſign or draught, is a part of the greateſt import and extent in painting. It is acquired chiefly by genius and application, rules being of leſs avail here than in any other branches of the art, as colouring, *&c.* The principal rules that regard deſign are, that novices accuſtom themſelves to copy good originals at firſt ſight; not to uſe ſquares in drawing, leſt they ſtint and confine their judgment; to deſign well from life, before they practiſe perſpective; to learn to adjuſt the ſize of their figures to the viſual angle, and the diſtance of the eye from the model or object; to mark out all the parts of their deſign before they begin to ſhade; to make their contours in great pieces, without taking notice of the little muſcles, and other breaks; to make themſelves maſters of the rules of perſpective; to obſerve the perpendicular, parallel, and diſtance of every ſtroke; to compare and oppoſe the parts that meet and traverſe the perpendicular, ſo as to form a kind of ſquare in the mind, which is the great and almoſt the only rule of deſigning juſtly; to have a regard not only to the model, but to the parts already deſigned, there being no ſuch thing as deſigning with ſtrict juſtneſs, but by comparing and proportioning every part to the firſt. All the other rules relate to perſpective. See PERSPECTIVE.

DESIGNATION, the act of marking or indicating, and making a thing known. There were deſignations of the conſuls and other magiſtrates among the Romans ſome time before their election.

DESIGNATOR, in roman antiquity, a ſort of petty maſter of the ceremonies, who aſſigned every body their places in the theatres, and other public ſhews. The Romans had officers of this nature attending all their ſolemn ſhews and proceſſions, for directing precedencies. The deſignator was one of the goddeſs Libitina's principal ſervants, the ſhews of the funerals of perſons of quality being marſhalled by the deſignator. When he went to raiſe the corps, he was attended with a train of funeral officers called libitinarii, ſubdivided into pellinatores, veſpiliones, uſtores, *&c.* All theſe, habited in black, walked before the deſignator, as mace-bearers before magiſtrates.

DESIGNING, the art of delineating or drawing the appearance of natural objects, by lines, on a plane.

To deſign, according to the rules of mathematics, makes the object of perſpective. See the article PERSPECTIVE.

To deſign by the camera obſcura. See the article CAMERA OBSCURA.

Mechanical method of DESIGNING. There are ſeveral methods of deſigning mechanically. The following is the method of the learned Sir Chriſtopher Wren, and may be put in practice with great eaſe.

A is a ſmall ſight, with a ſhort arm B (plate LXIX. fig. 5.) which may be turned round about, and moved up and down the ſmall cylinder C D, which is ſcrewed into the piece E D, at D; this piece E D moving round about the center E, by which means the ſight may be removed either towards E or F.

E F is a ruler faſtened on the two rulers G G, which rulers ſerve both to keep the ſquare frame S S S S perpendicular, and, by their ſliding through the ſquare holes T T, they ſerve to ſtay the ſight, either farther from, or nearer, to the ſaid frame; on which frame is ſtuck, with a little wax, the paper O O O O, whereon the picture is to be drawn by the pen I. The pen I is, by a ſmall braſs handle V, ſo fixed to the ruler H H, that the point I may be kept very firm, ſo as always to touch the paper. H H is a ruler that is conſtantly, by means of the ſmall ſtrings *a a a*, *b b b*, moved horizontally, or parallel to itſelf; at the end of which is ſtuck a ſmall pin, whoſe head P is the ſight, which is to be moved up and down on the out-lines of any object.

The contrivance of the ſtrings is this: the two ſtrings *a a a*, *b b b*, are exactly of an equal length. Two ends of them are faſtened into a ſmall leaden weight, which is employed in a ſocket on the backſide of the frame, and ſerves exactly to counterpoiſe the ruler H H, being of an equal weight with it. The other two ends of them are faſtened to two ſmall pins H H, after they have rolled about the ſmall pullies M M, L L, K K; by means of which pullies, if the pen I be taken hold of, and moved up and down the paper, the ſtring moving very eaſily, the ruler will always remain in an horizontal poſition.

The manner of uſing it is this: ſet the inſtrument upon a table, and fix the ſight

A at what height above the table, and at what diſtance from the frame S S S S, you pleaſe. Then looking through the ſight A, holding the pen I in your hand, move the head of the pin P up and down the out-lines of the object, and the point of the pen I will deſcribe on the paper O O O O the ſhape of the object ſo traced.

DESISE, a town of France, ſituated on the river Loire, fifteen miles ſouth-eaſt of Nevers: eaſt longitude 3° 32′, north latitude 46° 48′.

DE SON TORT DEMESN, in law, a formula uſed, in an action of treſpaſs, by way of reply to the defendant's plea; ſignifying that the treſpaſs was his own voluntary and free act.

DESPOTE, a term ſometimes uſed for an abſolute prince. See the next article.

Under the emperors of Conſtantinople, deſpote was a title of honour given to the emperor's ſons, or ſons in law; as alſo to their colleagues, and partners in the imperial dignity, in the ſame manner as Cæſar was at Rome. See the article CÆSAR.

DESPOTICAL, in general, denotes any thing that is uncontrouled and abſolute; but is particularly uſed for an arbitrary government, where the power of the prince is unlimited, and his will a law to his ſubjects: ſuch are thoſe of Turky, Perſia, and moſt of the eaſtern governments; and even thoſe of Europe, if we except the republics, our own, and the ſwediſh government.

DESPOUILLE′, in heraldry, the whole caſe, ſkin, or ſlough of a beaſt, with the head, feet, tail, and all appurtenances, ſo that being filled and ſtuffed, it looks like the intire creature.

DESPUMATION, a term ſometimes uſed for the clarifying a liquor, by the ſkimming off its froth. See CLARIFICATION.

DESQUAMATION, the ſame with exfoliation. See EXFOLIATION.

DESSAW, a city of upper Saxony, in Germany, ſituated on the river Elbe, ſixty miles north-weſt of Dreſden, and ſubject to the prince of Anhalt Deſſaw: eaſt long. 12° 40′, north lat. 51° 50′.

DESSERT, or DESART, a ſervice of fruits and ſweet-meats, uſually ſerved up laſt to table.

DESSICCATIVE, or DESICCATIVE, in pharmacy, an epithet applied to ſuch topical medicines as dry up the humours flowing to a wound or ulcer. See the article WOUND.

DESTILLATION, or DISTILLATION. See the article DISTILLATION.

DESTINIES, in mythology, the ſame with parcæ. See the article PARCÆ.

DESTINY, among philoſophers and divines, the ſame with fate. See FATE.

DESTRUCTION, in general, an alteration of any thing from its natural ſtate to one contrary to nature; whereby it is deemed the ſame with corruption. See the article CORRUPTION.

A chemical deſtruction, or corruption, is nothing but a reſolution of the whole naturally mixt body into its parts.

DESUDATION, in medicine, a profuſe and inordinate ſweat, ſucceeded by an eruption of puſtules, called ſudamina, or heat-pimples. See the article SUDAMINA.

DESULTOR, in antiquity, a vaulter, or leaper, who, leading one horſe by the bridle, and riding another, jumped from the back of one to the other, as the cuſtom was after they had run ſeveral courſes, or heats.

This practice required great dexterity, being performed before the uſe of either ſaddles or ſtirrups. The cuſtom was practiſed in the army, when neceſſity required it; but chiefly among the Numidians, who always carried two horſes, at leaſt, with them for that purpoſe, changing them as they tired. The Greeks and Romans borrowed the practice from them, but only uſed it at races, games, &c. The Sarmatæ were great maſters of this exerciſe, and huſſars have ſtill ſome remains of it; but now we ſee the moſt dexterous feats of this kind that perhaps were ever known in any age or nation performed by our countryman, Mr. Johnſon.

DETACHED PIECES, in fortification, are ſuch out-works as are detached, or at a diſtance from the body of the place; as demilunes, ravelines, baſtions, &c.

In painting, the figures are ſaid to be well detached, when they ſtand free and diſengaged from each other.

DETACHMENT, in military affairs, a certain number of ſoldiers drawn out from ſeveral regiments or companies equally, to be employed as the general thinks proper, whether on an attack, at a ſiege, or in parties to ſcour the country.

A detachment of two or three thouſand men, is a command for a brigadier; eight hundred, for a colonel; four or five hundred for a lieutenant-colonel. A captain never marches on a detachment with leſs than fifty men, a lieutenant, an enſign, and two ſerjeants. A lieutenant is allowed thirty, and a ſerjeant; and a ſerjeant ten or twelve men. Detachments are ſometimes made of intire ſquadrons and batallions.

DETENTS, in clock-work, are thoſe ſtops, which, by being lifted up or let down, lock or unlock the clock in ſtriking. See the article CLOCK.

DETENT-WHEEL, or HOOP-WHEEL, in a clock, that wheel which has a hoop almoſt round it, wherein there is a vacancy at which the clock locks.

DETERGENTS, *detergentia*, in pharmacy, ſuch medicines as are not only ſoftening and adheſive, but alſo, by a peculiar activity, conjoined with a ſuitable configuration of parts, are apt to abrade, and carry along with them ſuch particles, as they lay hold on in their paſſage.

Medicines of this kind are ſuppoſed to cleanſe, and fill up with new fleſh, all ulcerations and foulneſs occaſioned thereby, whether internal or external. To do this internally, the medicine is ſuppoſed to maintain its primary properties, till it arrives at the place of action, where it is intitled to the appellation of a detergent and vulnerary, by its adheſive quality, which conſiſts in the comparative largeneſs of its ſurface, and flexibility of its component parts; for by this it readily adheres to the ſlough of ulcerous exudations, which are eaſily carried along with the medicine; and when this is done, what was inſtrumental in deterging, will afterwards ſtick to the cutaneous filaments, till, by the protruſion of proper nouriſhment, the ulcer is healed; and, in like manner, the operation of external ſubſtances are accounted for: only this is to be taken notice of, that internally whatſoever mixes with the animal fluids, will be the firſt ſeparated and left behind; for all thoſe parts which are ſpecifically heavieſt, will move neareſt the axis of the canals, becauſe their momenta are greateſt, and will carry them nearly in a ſtraight line: but the lighter parts will be always juſtled to the ſides, where they ſooneſt meet with out-lets, or are ſtruck into the eroded cavities, in which they adhere and make part of the ſubſtance. Thus it is eaſy to conceive how an increaſe of thoſe qualities of activity and adheſion may make a medicine ariſe to the greateſt efficacy in this reſpect, even ſo far, as to fetch off the membranes and capillary veſſels.

DETERMINATE PROBLEM, in geometry, that which has but one, or, at leaſt, a limited number of anſwers: as the following problem, which has but one only ſolution, *viz.* To deſcribe an iſoſceles triangle on a given line, whoſe angles at the baſe ſhall be double that at the vertex. But the following hath two ſolutions, *viz.* To find an iſoſceles triangle, whoſe area and perimeter are given.

A determinate problem may be either ſimple or linear, plain, ſolid, or ſurſolid.

DETERMINATION, in mechanics, ſignifies much the ſame with the tendency or direction of a body in motion. See the articles DIRECTION and MOTION.

DETERMINATION, among ſchool-divines, is an act of divine power, limiting the agency of ſecond cauſes, in every inſtance, to what the deity predeſtinated concerning them. See PREDESTINATION.

Such a determination the Thomiſts, and other predeſtinarians, maintain neceſſary to all the actions of natural agents, particularly mankind. The Jeſuits, on the other hand, deny ſuch a determination, as ſuppoſing it inconſiſtent with liberty and free-will.

DETERSIVES, in pharmacy, the ſame with detergents. See DETERGENTS.

DETINUE, in law, a writ or action that lies againſt one who has got goods or other things delivered to him to keep, and afterwards refuſes to deliver them. In this action the thing detained is generally to be recovered, and not damages; though, if a perſon cannot recover the thing itſelf, he ſhall recover the damages, and alſo for the detainer. The nature of a thing muſt continue without any alteration, to intitle this action: beſides, it is neceſſary that the thing detained be known; therefore it does not lie for money out of a bag, corn out of a ſack, *&c.* Where goods are delivered to a perſon, and he delivers them over to another, action of detinue may be had againſt the ſecond perſon; and notwithſtanding he delivers the things to a perſon who has a right to the ſame, yet he is chargeable. If the perſon to whom a thing is delivered happen to die, action of detinue lies againſt his executors, *&c.* A man may have a general detinue againſt another that finds his goods; but if before the owner brings his action, the finder ſells them, or they are recovered from him on an execution, *&c.* he cannot have detinue.

DETINUE *of charters*. An action for detinue lies for deeds and charters which make the title to lands. An heir, in caſe of diſſeiſin, may have a detinue of charters, though he has not land. If in this action the iſſue be upon the detinue, and it is found by jury that the defendant hath burnt the charters, the plaintiff ſhall have judgment to recover the lands in damages.

DETINUE *of goods in frank marriage*, is had after a divorce between a man and his wife, for her to recover the goods given with her in marriage.

DETONATION, in chemiſtry, the noiſe and exploſion which any ſubſtance makes upon the application of fire to it. It is alſo called fulmination.

DETRANCHE', in heraldry, a line bendwiſe, proceeding always from the dexter ſide, but not from the very angle, diagonally athwart the ſhield.

DETTINGEN, a village of Germany, about nine miles eaſt of Hanau, in the circle of the upper Rhine: eaſt long. 8° 45′, and north lat. 50° 8′.

DEVA, a port-town of Spain, ſituated on the bay of Biſcay, forty miles eaſt of Bilboa: weſt long. 2° 10′, and north lat. 43° 20′.

DEVASTAVIT, or DEVASTAVERUNT, BONA TESTATORIS, in law, a writ which lies againſt executors or adminiſtrators for waſting the teſtator's goods, or paying debts upon ſimple contracts before debts on bonds, and other ſpecialities; alſo for paying legacies before debts; and, generally, for ſquandring the effects of the deceaſed, and not paying his debts.

DEVENERUNT, in law, a writ which lay formerly on the death of the heir of the king's tenant, and directed to the eſcheator; commanding him to inquire by the oaths of good and lawful men, what lands and tenements came to the king by the death of the tenent.

DEVENSHRING, or DENSHRING, a term uſed in many parts of the kingdom for burning of land. See BURNING *of land*.

DEVENTER, a city of the united Provinces, and province of Overyſſel, about eight miles north of Zutphen: eaſt long. 6°, and north lat. 52° 20′.

DEVIATION, in old aſtronomy, ſignified the motion of the deferent or excentric, whereby it advanced to, or receded from, the ecliptic.

DEVICE, or DEVISE, among painters. See the article DEVISE.

DEVIL, διάβολος, an evil angel, one of theſe celeſtial ſpirits, caſt down from heaven, for pretending to equal himſelf with God. The Ethiopians paint the devil white, to be even with the Europeans who paint him black. There is no mention of the word devil in the Old Teſtament, but only of the word Satan and Belial: nor do we meet with it in any heathen authors, in the ſenſe it is taken among chriſtians, that is, as a creature revolted from God. Their theology went no farther than to evil genii, or dæmons. See the articles GENIUS and DÆMONS.

Some of the american idolaters have a notion of two collateral, independent beings, one of whom is good, and the other evil; which laſt they imagine has the direction and ſuperintendance of this earth, for which reaſon they chiefly worſhip him: whence thoſe that give us an account of the religion of theſe ſavages give out, with ſome impropriety, that they worſhip the devil. The Chaldeans, in like manner, believed both a good principle and an evil one, which laſt they imagined was an enemy to mankind.

Iſaiah, ſpeaking, according to ſome commentators, of the fall of the devil, calls him Lucifer, from his former elevation and ſtate of glory: but others explain this paſſage of Iſaiah in reference to the king of Babylon, who had been precipitated from his throne and glory. The Arabians call Lucifer, Eblis, which ſome think is only a diminutive or corruption of the word Diabolus.

DEVIL-IN-A-BUSH, a plant called by authors nigella. See the article NIGELLA.

DEVIL'S BIT, the ſame with the ſcabious of botaniſts. See the article SCABIOUS.

DEVINCTION, in antiquity, a kind of love-charm, deſcribed by Virgil in his eighth eclogue: it conſiſted in tying certain knots, and repeating a formula of words.

DEVISE, or DEVICE, in heraldry, painting and ſculpture, any emblem uſed to repreſent a certain family, perſon, action, or quality; with a ſuitable motto, applied in a figurative ſenſe. See MOTTO.

The eſſence of a deviſe conſiſts in the metaphorical ſimilitude between the things repreſenting and repreſented: thus a young nobleman, of great courage and ambition, is ſaid to have borne for his deviſe, in the laſt carrouſal at the court of France, a rocket mounted in the air, with this motto in italian, *poco duri purche m' inalzi*; expreſſing, that he preferred a ſhort life, provided he might thereby attain to glory and eminence.

The Italians have reduced the making deviſes into an art, ſome of the principal laws of which are theſe: 1. That there be nothing monſtrous or extravagant in the figures. 2. That figures be never joined which have no relation or affinity to each other; excepting ſome whimſical unions eſtabliſhed in antient fables, which cuſtom has authoriſed. 3. That the human body be never uſed. 4. The fewer the figures the better. 5. The motto ſhould be every way ſuitable.

DEVISE is frequently alſo uſed for cipher. See the article CIPHER.

DEVISE, in law, the act whereby a perſon bequeaths his lands or tenements to another, by his laſt will and teſtament.

The perſon who makes this act, is called the deviſor, and he in whoſe favour the act is made, is termed in law the deviſee. The law interprets the words of a will in a larger and more favourable ſenſe than thoſe of a deed: for if land be deviſed to a man to have to him for ever, or to have to him and his aſſigns, in thoſe caſes the deviſee ſhall have a fee-ſimple; yet if given in the ſame manner by feoffment, grant, or gift, he ſhall have but an eſtate for life: ſo if one deviſe land to an infant in his mother's belly, it is a good and valid deviſe, though it is otherwiſe by feoffment, grant, or gift; for in thoſe caſes, there ought to be one of ability to receive preſently, otherwiſe it is void. See the articles DEED and WILL.

DEVISES, a borough-town in Wiltſhire, eighteen miles north-weſt of Saliſbury: weſt longitude 2° 6′, and north latitude 51° 25′.

It ſends two members to parliament.

DEUNX, in roman antiquity, eleven ounces, or $\frac{11}{12}$ parts of the as. See AS.

DEVOLVED, ſomething acquired by right of devolution. See the next article.

DEVOLUTION, in law, a right acquired by ſucceſſion from one to another.

DEVONSHIRE, a county in the weſt of England, bounded by the Briſtol channel, on the north; by Somerſetſhire and Dorſetſhire, on the eaſt; by the engliſh channel, on the ſouth; and by Cornwal, on the weſt. From this county the noble family of Cavendiſh take the title of duke.

DEVOTION, *devotio*, a ſincere ardent worſhip of the deity.

Devotion, as defined by Jurieu, is a ſoftening and yielding of the heart, with an internal conſolation, which the ſouls of believers feel in the practice or exerciſe of piety. By devotion is alſo underſtood certain religious practices, which a perſon makes it a rule to diſcharge regularly, and with reaſon, if the exactitude be founded on ſolid piety, otherwiſe it is vanity or ſuperſtition. That devotion is vain and trifling, which would accommodate itſelf both to God and to the world.

DEVOTION, among the Romans, was a kind of ſacrifice, or ceremony, whereby they conſecrated themſelves to the ſervice of ſome perſon. The antients had a notion, that the life of one might be ranſomed by the death of another, whence thoſe devotions became frequent for the lives of the emperors. Devotion to any particular perſon, was unknown among the Romans till the time of Auguſtus. The very day after the title of Auguſtus had been conferred upon Octavius, Pacuvius, a tribune of the people, publicly declared, that he would devote himſelf to Auguſtus, and obey him at the expence of his life, as was the practice among barbarous nations, if he was commanded. His example was immediately followed by all the reſt, till, at length, it became an eſtabliſhed cuſtom never to go to ſalute the emperor, without declaring that they were devoted to him. Before this, the practice of the Romans was that of devoting themſelves to their country. The devotion of Decius, who, after devoting himſelf to his country, threw himſelf into the hands of his enemies and was killed, is ſaid to have gained the Romans the victory.

DEVOURING, in heraldry, is when fiſhes are borne in an eſcutcheon in a feeding poſture, for they ſwallow all the meat whole.

DEUTERO-CANONICAL, in theology, a term applied to certain books of ſcripture which were added to the canon after the reſt; either becauſe they were not wrote till after the canon was compiled, or becauſe of ſome debate in regard to their canonicity.

The Jews undoubtedly acknowledge ſeveral books in their canon which were put there later than the reſt. They alledge, that under Eſdras, a great aſſembly of their doctors, which, by way of eminence, they term the great ſynagogue, collected the holy books, which now compoſe the hebrew Old Teſtament: and they allow, that this aſſembly put books therein, that had not been in it before the babyloniſh captivity. Such are thoſe of Daniel, Ezekiel, Haggai, *&c.* and the books of Eſdras and Nehemiah.

The church of Rome added, ſince then,

others to the canon that were not in the canon of the Jews, nor could be there, by reaſon ſome of them were not compoſed till after: ſuch are the books of Eccleſiaſticus, with ſeveral of the apocryphal books; as thoſe of the Maccabees, Wiſdom, &c. Others were added ſtill later, by reaſon their canonicity had not been examined; and till ſuch examen and judgment, they might be ſet aſide at pleaſure.

The deutro-canonical books in the modern canon, are the books of Eſther, either the whole, or, at leaſt, the ſeven laſt chapters of it: the epiſtle to the Hebrews, thoſe of James and Jude; the ſecond of St. Peter, the ſecond and third of St. John, and the Revelations. The deutro canonical parts of books are the hymn of the three Children, the prayer of Azariah, the hiſtories of Suſannah, of Bel and the Dragon, the laſt chapter of St. Mark, the bloody ſweat and appearance of the angel, related in Luke xxii. and the hiſtory of the adulterous woman in John viii.

DEUTERONOMY, a canonical book of the Old Teſtament, and the laſt of the pentateuch of Moſes. See the articles BIBLE, CANON, and PENTATEUCH.

This book was called Deuteronomy by the ſeventy greeks tranſlators, as being a recapitulation of the laws before delivered at large.

DEUTEROPOTMI, δευτεροπότμοι, in grecian antiquity, a deſignation given to ſuch of the Athenians as had been thought dead, and, after the celebration of the funeral rites, unexpectedly recovered. It was unlawful for the deuteropotmi to enter into the temple of the Eumenides, or to be admited to the holy rites, till after they were purified, by being let thro' the lap of a woman's gown, that they might ſeem to be new born.

DEUTEROSIS, the greek name by which the Jews called their miſchnah, or ſecond law. See the article MISCHNAH.

Euſebius accuſes the Jews with corrupting the true ſenſe of ſcripture with the trifling explanations of their deuteroſis. Epiphanius ſays, that there were four ſorts of theſe quoted: the firſt under the name of Moſes, the ſecond under that of Akiba, the third under that of Adda, or Judah, and the fourth under the name of the ſons of the Aſmonæans, or Maccabees. It is not eaſy to ſay, whether the preſent Miſchnah is the ſame with any of theſe; whether it contains them all, or only ſome part, or whether it be different from them all. St. Jerom ſays, that the Hebrews referred their deuteroſes to Shammai, and Hillel; he ſpeaks of the deuteroſes with the utmoſt contempt; he looked upon them as a collection of fables, childiſh ſtuff, and obſcenities.

DEVUIDER, in the manege, is applied to a horſe that, upon working upon volts, makes his ſhoulders go too faſt for the croupe to follow; ſo that, inſtead of going upon two heads as he ought, he endeavours to go only upon one. This comes from the reſiſtance he makes in defending againſt the heels; or from the fault of the horſeman, who is too haſty with his hand.

DEUX PONTS, a city of Germany, in the palatinate of the Rhine, ſixty miles north eaſt of Nancy: eaſt longitude 7° 15′, and north latitude 49° 25′.

DEW, a denſe moiſt vapour, falling on the earth in form of a miſling rain, while the ſun is below the horizon.

In the ſummer-ſeaſon, when the weather is fair and very dry, and the earth's ſurface has, for a conſiderable time, been parched with the great heat of the ſun, then, not only the watery, but likewiſe other leſs volatile particles, as the oily and ſaline, are, by the power of the ſolar rays, carried up into the air, and fill that part of it which lies neareſt to the ſurface of the earth; and ſo long as theſe exhalations are kept in agitation by the heat of the ſun, ſo long nothing of them appears to the eye: but as ſoon as the ſolar heat, which at three in the afternoon is the greateſt, begins to remit, the air not long after begins to grow cool, though the earth, which retains the heat communicated to it by the ſun a thouſand times longer than the air, being ſtill hot, continues to exhale the agitated corpuſcles: by which means there is collected a white, denſe vapour, which is cool above, but ſtill continues warm below. This vapour therefore appears firſt in ditches, and watery or marſhy places, whence diſperſing itſelf by degrees, it covers the face of the earth, in the evening and night-time, with a cloud, conſiſting of this kind of particles, which in the morning is again diſſipated by the heat of the riſing ſun. By this it appears, that dew is a very compound liquid, ſo that nothing can be aſſerted of its nature, which in every circumſtance would hold true. In gravel-pits, for inſtance, and in high, dry, healthy grounds of a large extent, there is collected but a very ſmall quantity of this vapour, and that almoſt intirely watery: whilſt that which is collected about ſtanding waters, fens, marſhes, and fat bituminous grounds, abounding with putrified fiſh, and other animals, is of a quite different nature, and very often pernicious to mankind: whence it is no wonder that chemiſts, in their analyſing of dew, ſhould find ſuch different reſults, that ſcarce any two are agreed about them: ſome dew, that had been collected in a certain part of the earth, has afforded a liquor, by diſtillation, which ſtruck the colours of the rainbow upon glaſs, ſo ſtrong as not to be effaced by friction, alkaline lixiviums, or aqua regia: it alſo burnt like ſpirit of wine: again ſome diſtilled dew, having been digeſted with a gentle heat for eight days, and then rectified ſix times over, till it was exceeding ſubtile, is reported to have broke three glaſs veſſels ſucceſſively, though it ſtill remained perfectly inſipid: again ſome dew is deſcribed to be like a yellowiſh butter, that melts by being rubbed upon the hand, yet grows hard and dry with a moderate heat, being of a fetid odour, and to be found in pretty large lumps in the night, eſpecially in the ſpring and winter. The nature of dew alſo differs ſurprizingly with the different ſeaſons of the year, and the various ſucceſſions of meteors: hence, exceedingly ſmall ſeeds of vegetables, and inviſible eggs of minute animals, with numerous other things coming to be digeſted, fermented, or putrified therein, it muſt afford many very different productions by diſtillation: whence chemiſts have formed very odd opinions about it.

Dew-born, in country affairs, a diſtemper in cattle, being a ſwelling in the body, as much as the ſkin can hold, ſo that ſome beaſts are in danger of burſting. This diſtemper proceeds from the greedineſs of a beaſt to feed, when put into a rank paſture: but commonly when the graſs is full of water. In this caſe the beaſt ſhould be ſtirred up and down, and made to purge well: but the proper cure is bleeding in the tail; then take a grated nutmeg, with an egg, and breaking the top of the ſhell, put out ſo much of the white as you may have room to ſlip the nutmeg into the ſhell; mix them together, and then let ſhell and all be put down the beaſt's throat; that done, walk him up and down, and he ſhall ſoon mend.

Mill-Dew, *rubigo*. See the article Rubigo.

Sun-Dew, *ros-ſolis*, in botany. See the article Ros-solis.

DEXTANS, in roman antiquity, ten ounces, or $\frac{10}{12}$ of their as. See As.

DEXTER, in heraldry, an appellation given to whatever belongs to the right ſide of a ſhield, or coat of arms: thus we ſay, bend-dexter, dexter-point, *&c.* See the articles Bend, Point, *&c.*

DEXTROCHERE, or Destrochere, in heraldry, is applied to the right arm painted in a ſhield, ſometimes naked, ſometimes cloathed, or adorned with a bracelet; and ſometimes armed, or holding ſome moveable, or member uſed in the arms.

DEY, in matters of government, the ſovereign prince of Algiers, anſwering to the bey of Tunis. See the article Bey.

DEYNSE, a town of Flanders, nine miles ſouth weſt of Ghent: eaſt long. 3° 30′, north lat. 51°.

DIA, δια, the beginning of ſeveral terms in medicine, pharmacy, ſurgery, *&c.* Where theſe three letters commence the name of a remedy, unguent, plaſter, *&c.* they ſignify compoſition and mixture, as diapoſma, *&c.*

Dia is alſo the beginning of many terms in the other arts, as diameter, dialogue, *&c.* See the article Diameter.

DIABETES, διαϐήτης, in phyſic, an exceſſive diſcharge of urine, which comes away crude, and exceeds the quantity of liquids drank.

It proceeds from weakneſs of the kidneys, which are too feeble and lax, eſpecially in thoſe who have been accuſtomed to drink too much.

Liſter obſerves, that a diabetes comes ſlowly on, and is a long while a breeding. In the beginning the mouth is dry, and the ſpittle a little white and frothy; the urine being ſomewhat more than uſual, with a ſmall thirſt. A heat begins to be perceived in the bowels, which is a little pungent; the patient falls away, and the mind is anxious and unſtable. In time the thirſt greatly increaſes, the urine is plentiful, and the body waſtes: when they make water, without intermiſſion, the thirſt is intolerable, and though much is drank, it is not proportionable to the water; when the urine is retained a little while, there is a ſwelling of the loins, ilia, and teſtes, and it comes away with pain. Now death is at hand. The urine is pale, and not ſweet, but more ſweetiſh at laſt than at firſt.

Sydenham obſerves, that the juices brought into the blood go off by urine: whence the ſtrength gradually fails, the body waſtes, and its ſubſtance is drained away: there is a thirſt, heat of the bowels, *&c.*

Strengtheners, moderate aſtringents, and a ſpecies of hyacinth, with crocus martis, are good in this diſeaſe, eſpecially with anodynes: or japan earth; or the tincture of vitriol of mars; and red wine, with water in a ſmall quantity: the drink ſhould be ſparing, and all exceſſes avoided, exerciſe and friction of the body are uſeful.

Liſter ſays, almonds and a milk-diet are proper in this diſtemper; as alſo, wine with ginger, allowing in the mean time a draught of milk and water to allay the thirſt.

Wallis preſcribes tincture of antimony and lime water, with ſaſſafras, aniſeeds, raiſins, or liquorice. Briſtol-water is reckoned excellent upon theſe occaſions: but Morgan ſays, that the tincture of cantharides is a medicine that may almoſt be depended on for checking, reſtraining, and ſtopping the immediate flux of urine.

DIABOTANUM, in pharmacy, a plaſter prepared of herbs deſcribed by Galen, De C. M. P. G. lib. vi. c. 2. It reſolves and diſcuſſes wens.

DIACARTHAMI, in pharmacy, an electuary compoſed of ſome purgatives with the addition of the pulp of the ſeed of carthamus, formerly mixed in medicines along with other purgatives, but now wholly out of uſe.

DIACAUSTIC CURVE, a ſpecies of cauſtic curves formed by refraction. Thus if you imagine an infinite number of rays B A, B M, B D, *&c.* (plate LXX. fig. 1.) iſſuing from the ſame luminous point B to be refracted to or from the perpendicular M C, by the given curve A M D, and ſo, that C E, the ſines of the angles of incidence C M E, be always to C G, the ſines of the refracted angles C M G, in a given ratio, then the curve H F N, which touches all the refracted rays, is called the diacauſtic, or cauſtic by refraction. See the article CAUSTIC CURVE.

DIACELTATESSON, in chemiſtry, a name given by Van Helmont, to a purging preparation procured from the fixed flowers of antimony. It is ſaid by its author to cure all intermittent and continued fevers. It is to be given without any acid, and if it operate too violently, the violence may be ſtopped by taking any thing acid. Boerhaave obſerves, that he had often given it with good ſucceſs, but never with thoſe effects which the author aſcribes to it, who ſays, that it radically cures the gout and fevers, heals ulcers of the larynx, œſophagus and bladder, and purges the body when in perfect health, but not otherwiſe.

DIACENTROS, a term uſed by Kepler, for the leſſer diameter of a planet's orbit.

DIACHALCITIS, in ſurgery and pharmacy, a plaſter compoſed of oil, axungia, and chalcitis, which formerly uſed to be applied after the amputation of a cancer, and on many other occaſions.

DIACHYLON, in pharmacy, an emollient digeſtive plaſter, compoſed of mucilages or viſcid juices drawn from certain plants. See the article MUCILAGE.

There are ſeveral plaſters deſcribed by diſpenſatory writers under the name of diachylon, but the following are thoſe ordered by the college of phyſicians. 1. Simple diachylon, compounded of fine oil, litharge of gold, the mucilages of fenugreek, linſeeds, and marſhmallow roots. 2. Diachylon magnum, the greater diachylon, made of the mucilages of raiſins, figs, marſhmallow roots, fenugreek, and linſeeds, birdlime, of the juices of orrice and ſquills, of œſypus, of the oils of orrice, camomile and dill, of litharge of gold, of turpentine, of roſin of the pine-tree, and of yellow wax. 3. Diachylon magnum cum gummi, the great diachylon with gums, which conſiſts of the former with the addition of ſtrained galbanum, bdellium, ſagapenum, and ammoniacum. 4. Compound diachylon or the mucilage plaſter, compoſed of yellow wax, the oil of mucilages, gum ammoniac, and common turpentine.

DIACODIUM, in pharmacy, a ſyrup prepared from poppy heads. It is alſo called the ſyrupus de meconio. As it is of conſequence that all the circumſtances in the directions for compounding this medicine, be exactly followed, we here give the method of preparing it from the London Diſpenſatory. Take of the heads of dried white poppies without their ſeeds, three pounds and a half, of water ſix gallons. Slice the heads and boil them in the water, often ſtirring them that they may not burn, till about a third only of the liquor is left, which will be almoſt all imbibed by the poppy heads: then take all from the fire, and preſs the liquor ſtrongly out from the heads: in the next place, boil the liquor by itſelf, to about two quarts, and ſtrain it while hot, firſt through a ſieve, and then through a thin flannel: ſet it by for a night, that what fæces have paſſed the ſtrainers, may ſubſide; next morning pour off the clear liquor, and boil it with ſix pounds of double refined ſugar, till the whole comes to the weight of nine pounds, or a little more, that it may become a ſyrup of a juſt conſiſtence. This ſyrup partakes of all the virtues of the poppy. See the article POPPY.

DIACONICON, in church hiſtory, an apartment anſwering to our veſtry. See the article VESTRY.

DIACOPE, in grammar, the ſame with tmeſis. See the article TMESIS.

DIACOUSTICS, called alſo DIAPHONICS, the conſideration of the properties of refracted ſound, as it paſſes through different mediums. See SOUND.

DIACRII, in grecian antiquity, an appellation given to a faction at Athens, who favoured oligarchy; in oppoſition to the pediaci, who were for a pure democratical government.

DIACYDONITES, in pharmacy, a term applied to thoſe remedies where quinces are a principal ingredient.

DIADELPHIA, in the linnæan ſyſtem of botany, a claſs of plants, the ſeventeenth in order; comprehending all thoſe with papilionaceous and hermaphrodite flowers, and leguminous ſeed-veſſels. See PAPILIONACEOUS and LEGUME.

The diſtinguiſhing characteriſtic of this claſs is, that the ſtamina adhere together; forming two diſſimilar bodies or filaments, the one ſtanding above the piſtil, and the other ſurrounding it. See plate XXX. fig. 17.

The lower part of this laſt is membranaceous, and of a cylindrical figure, only open above; but towards the top, it is divided into ſeveral ſubulated bodies, whereof thoſe in the middle are alternately longer and ſhorter by pairs. The upper filament is ſingle, altogether ſubulated, and covers the ſlit of the cylindraceous part of the under one. Add to this, that the piſtil is ſingle; its germ oblong, and rounded; its ſtyle, ſubulato-filiform; and the ſtigma covered with down, of the length of the ſtyle, and lying directly below the antheræ of the ſtamina. This is a very natural claſs, and comprehends peaſe, beans, vetches, liquorice, and a great many other genera.

DIADEM, in antiquity, a head band, or fillet, worn by kings, as a badge of their royalty. It was made of ſilk, thread, or wool, and tied round the temples and forehead, the ends being tied behind, and let fall on the neck. It was uſually white, and quite plain, though ſometimes embroidered with gold, and ſet with pearls and precious ſtones. In latter times, it came to be twiſted round crowns, laurels, &c. and even appears to have been worn on divers parts of the body. See the article CROWN.

DIADEM, in heraldry, is applied to certain circles, or rims, ſerving to incloſe the crowns of ſovereign princes, and to bear the globe and croſs, or the flower de luces for their creſt. The crowns of ſovereigns are bound, ſome with a greater, and ſome with a leſs number of diadems. The bandage about the heads of moors on ſhields is alſo called diadem, in blazoning.

DIÆRESIS, in ſurgery, an operation ſerving to divide and ſeparate the part when the continuity is a hindrance to the cure. Some profeſſors divide ſurgery into ſix parts, aſſigning to each greek names, of which diæreſis is one.

DIÆRESIS, in medicine, is the conſuming of the veſſels of an animal body, when from ſome corroding cauſe certain paſſages are made, which naturally ought not to have been; or certain natural paſſages are dilated beyond their ordinary dimenſions, ſo that the humours which ought to have been contained in the veſſels extravaſate or run out.

DIÆRESIS, in grammar, the diviſion of one ſyllable into two, which is uſually noted by two points over a letter, as aulaï inſtead of aulæ, diſſolüenda for diſſolvenda.

DIÆRESIS is alſo the ſame with what is otherwiſe called tmeſis. See TMESIS.

DIÆTETÆ, in grecian antiquity, a kind of judges, of which there were two ſorts, the cleroti and dialacterii. The former were public arbitrators, choſen by lot to determine all cauſes exceeding ten drachms, within their own tribe, and from their ſentence an appeal lay to the ſuperior courts.

The dialacterii, on the contrary, were private arbitrators from whoſe ſentence there lay no appeal, and accordingly they always took an oath to adminiſter juſtice without partiality.

DIAGLYPHICE, the art of cutting or

engraving figures on metals, ſuch as ſeals, intaglias, matrices of letters, *&c.* or coins for medals. See the articles ENGRAVING and SCULPTURE.

DIAGNOSTIC, in medicine, a term given to thoſe ſigns which indicate the preſent ſtate of a diſeaſe, its nature and cauſe. There are two principles upon which the diagnoſis of diſeaſes is founded: the firſt depends on a knowledge of the preceding cauſes, which are ſuch as appear to have produced the ſame diſeaſe before: and the ſecond is a knowledge of the diſeaſe in its own nature, and preſent effects. To the diagnoſis of fevers, belongs the knowledge of their various ſtages or times, as diſtinguiſhed into beginning, increaſe, height, and declenſion.

DIAGONAL, in geometry, a right line drawn acroſs a quadrilateral figure, from one angle to another, by ſome called the diameter, and by others, the diameter of the figure. Thus *a b* in plate LXX. fig. 2. is called a diagonal.

It is demonſtrable, 1. That every diagonal divides a parallelogram into two equal parts. 2. That two diagonals drawn in any parallelogram biſect each other. 3. A line *f g*, paſſing through the middle point of the diagonal of a parallelogram, divides the figure into two equal parts. 4. The diagonal of a ſquare is incommenſurable with one of its ſides. 5. That the ſum of the ſquares of the two diagonals of every parallelogram is equal to the ſum of the ſquares of the four ſides. This propoſition is of great uſe in the theory of compound motions; for, in an oblique angled parallelogram, the greater diagonal being the ſubtenſe of an obtuſe, and the leſſer of an acute, angle, which is the complement of the former, if the obtuſe angle be conceived to grow till it be infinitely great with regard to the acute one, the great diagonal becomes the ſum of the two ſides, and the leſſer one, nothing. Now two contiguous ſides of a parallelogram being known, together with the angle they include, it is eaſy to find one of the diagonals in numbers, and then the foregoing propoſition gives the other. This ſecond diagonal is the line that would be deſcribed by a body impelled at the ſame time by two forces which ſhould have the ſame ratio to each other, as the contiguous ſides have, and act in thoſe two directions; and the body would deſcribe this diagonal in the ſame time, as it would have deſcribed either of the contiguous ſides in, if only impelled by the force correſponding thereto. See the article COMPOSITION *of Motion.*

DIAGONAL SCALE. See SCALE.

DIAGRAM, in geometry, a ſcheme for explaining and demonſtrating the properties of any figure, whether triangle, ſquare, circle, *&c.* See the articles TRIANGLE, SQUARE, *&c.*

DIAGRAM, among antient muſicians, the ſame with the ſcale of the moderns. See the article SCALE.

Its utmoſt extent was only two octaves; the loweſt note being to the higheſt as 1 to 4.

Within this compaſs, they had eighteen notes or ſounds; the names of which, beginning with the loweſt, are theſe:

Proſlambanomenos, anſwering to our	A	
Hypate hypaton	B ♮	
Parypate hypaton	C	
Lichanos hypaton	D	
Hypate meſon	E	
Parypate meſon	F	
Lichanos meſon	G	
Meſe	a	Meſe
	b ♭	Trite ſynemmenon
Parameſe	b ♮	
Trite diezeugmenon	c	Paranete ſynemmenon
Paranete diezeugmenon	d	Nete ſynemmenon
Nete diezeugmenon	e	
Trite hyperbolæon	f	
Paranete hyperbolæon	g	
Nete hyperbolæon	aa	

This

Fig. 1. **DIACAUSTIC.**

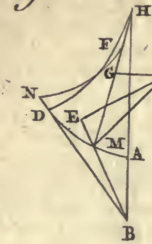


Fig. 2. **DIAGONAL.**

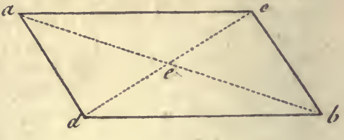
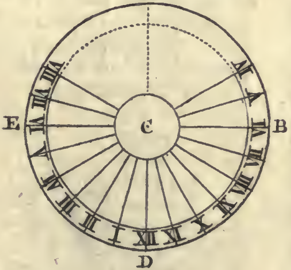


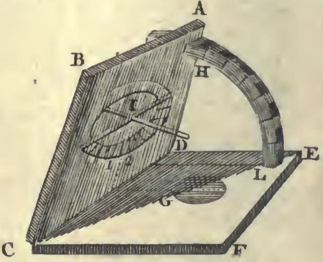
Fig. 3.

DIALS.

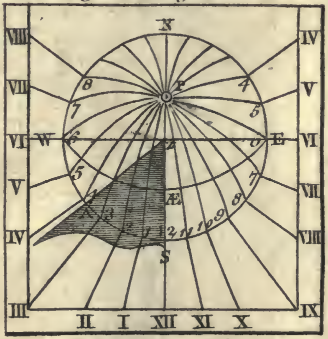
N.° 1. Equinoctial.



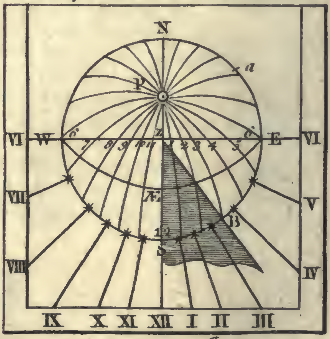
N.° 2. Universal Equinoctial



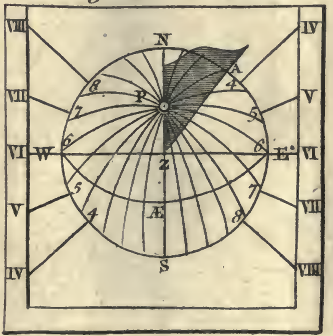
N.° 3. Horizontal.



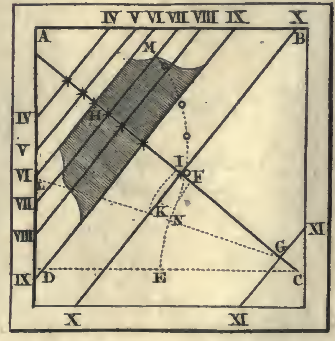
N.° 4. South Vertical.



N.° 5. North Vertical.



N.° 6. East Vertical.



T Jefferys sculp

This diagram, it is to be obſerved, repreſents only the diatonic genus, where the notes or ſounds are by no means diſtinct, the paranete ſynemmenon coinciding with the trite diezeugmenon, and the nete ſynemmenon with the paranete diezeugmenon. It is alſo obſervable, that ſome of the notes ſtand nearer together than the reſt; the interval between the latter being a tone, and between the former only a ſemitone. See the article INTERVAL.

DIAGRYDIUM, in pharmacy, a preparation of ſcammony, invented by Galen: it conſiſts in baking the ſcammony in a quince, but is at preſent ſeldom uſed, the ſcammony being found not to need any correction. See the article SCAMMONY.

DIAHEXAPLA, or **DIAHEXAPTE**, among farriers, a compound medicine, ſo called from its containing ſix ingredients, *viz.* birthwort and gentian roots, juniper-berries, bay-berries, myrrh, and ivory ſhavings. It is commended for colds, conſumptions, purſineſs, and many other diſorders in horſes.

DIAL, or **SUN-DIAL**, an inſtrument ſerving to meaſure time by means of the ſhadow of the ſun.

Sun-dials are differently denominated according to their different ſituation, and the figure of the ſurfaces upon which they are deſcribed, as horizontal, vertical, equinoctial, polar, direct, erect, declining, inclining, reclining, cylindrical, &c. We ſhall here proceed to deſcribe theſe particular kinds of dials; and explain the philoſophical principles on which dialing is founded under the article DIALING.

Dials are diſtinguiſhed into primary and ſecondary.

Primary **DIAL**, that either drawn on the plane of the horizon, called an horizontal dial; or perpendicular thereto, on the planes either of the meridian, or prime vertical, called a vertical dial; to which are added thoſe drawn on the polar and equinoctial planes, though neither horizontal nor vertical.

Equinoctial **DIAL**, is that deſcribed on an equinoctial plane, or a plane repreſenting that of the equinoctial. They are uſually diſtinguiſhed into upper, which look towards the zenith, and lower, which reſpect the nadir. Now as the ſun only illumines the upper ſurface of an equinoctial plane, while he is in our hemiſphere, or on the northern ſide of the equator, an upper equinoctial dial will only ſhew the hour during the ſpring and ſummer ſeaſon. And again, as the ſun only illumines the lower ſurface of an equinoctial plane, while he is in the ſouthern hemiſphere, or on the other ſide of the equator, a lower equinoctial dial will only ſhew the hour in autumn and winter. To have an equinoctial dial therefore that ſhall ſerve all the year round, the upper and lower muſt be joined together; that is, it muſt be drawn on each ſide of the plane.

To deſcribe an upper equinoctial **DIAL**. From a center C (plate LXX. fig. 3. n° 1.) deſcribe a circle A B D E, and by two diameters A D and B E, interſecting each other at right angles, divide it into quadrants A B, B D, D E and E A. Subdivide each quadrant into ſix equal parts by the right lines, C I, C II, C III, &c. which lines will be hour lines, and thro' the center C drive a ſtyle or pin perpendicular to the plane A B D E. The dial thus deſcribed being raiſed ſo as to be in the plane of the equator, the line C XII, in the plane of the meridian, and the point A looking towards the ſouth; the ſhadow of the ſtyle will ſhew the hours both of the forenoon and afternoon.

A lower equinoctial **DIAL** is deſcribed in the ſame manner, with this exception, that no hour lines are to be drawn beyond that of ſix o'clock.

To deſcribe an univerſal equinoctial **DIAL**: join two metal planes A B C D and C D E F, (ibid. n° 2.) ſo as to be moveable at the joint. On the upper ſurface of the plane A B C D deſcribe an upper equinoctial dial; and upon the lower, a *lower*, as already directed, and through the center I. drive a ſtyle. In the plane D E F C cut a box, and put a magnetical needle G therein; fit on the ſame plane a braſs quadrant L H, nicely graduated, and paſſing through a hole H cut in the plane A B C D. Now ſince this may be ſo placed by means of the needle, as that the line I 12 ſhall be in the plane of the meridian, and by means of the quadrant ſo raiſed, as that the angle B C F ſhall be equal to the elevation of the equator, it will ſerve as a dial in any part of the world. On this dial may be drawn ſeveral concentric circles, which will ſhew the ſun's place and declination. Thus divide the ſtyle into 100 parts, which being the radius of a circle, take the complement of the declination 5°, 10°, 15°, &c. and with the tangent of theſe degrees deſcribe concentric circles, and when the end of the ſhadow of the ſtyle comes into one of them, it ſhews the declination and the ſun's place, which may be marked on the circles.

Horizontal Dial, that deſcribed on a plane parallel to the horizon.

To draw the hour lines upon an horizontal Dial, geometrically, draw a right line N S (*ibid.* n° 3.) for the meridian and hour line of 12, and croſs it with another E W, for the hour line of 6 at right angles in Z: and upon Z as a center deſcribe a circle E N W S, repreſenting the horizon, of London, for example, whoſe latitude is 51° 32, and likewiſe this dial plane. Within this circle project the ſphere according to your latitude: then ſhall the ſeveral hour circles touching the plane of the horizon give you points to draw the hour lines upon your dial plane. If a ruler therefore is laid to Z, and every one of the points 1, 2, 3, *&c.* 11, 10, 9, *&c.* and ſtraight lines drawn, theſe lines ſhall be the true hour lines for your horizontal dial. There is nothing required to compleat this dial but to make the height of the ſtyle equal to the latitude of the place. Wherefore for the latitude of London take 51° 32′ from your ſcale of chords, and ſet them upon the horizon from S to A, and draw a line Z A for the ſtyle. This ſubſtyle, upon which the ſtyle ſtands in all horizontal dials, is the meridian, or hour line of 12.

In large dials, where great accuracy is required, it is beſt to determine the lines of the dial by trigonometrical calculation, in which the elevation of the pole of the place being given, the angles which the hour lines make with the meridian in the center of the dial are found by the following canon. As the ſine of 90°, is to the ſine of the elevation of the pole or latitude of the place; ſo is the tangent of each hour's equinoctial diſtance from the meridian, to the tangent of the angle required.

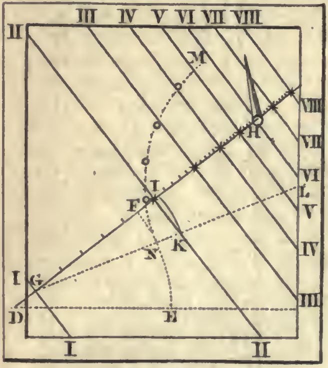
Vertical Dial, that drawn on the plane of a vertical circle. The verticals chiefly uſed are the prime vertical and the meridian, whence ariſe ſouth, north, eaſt, weſt dials. If the dial reſpects the cardinal points of the horizon, it is called *direct*, but if any other vertical be choſen, it is ſaid to *decline*. Again, if the circle whoſe plane is uſed be perpendicular to the horizon, the dial is denominated *erect*; but if the plane be oblique to the horizon, it is ſaid to *incline* or *recline*.

Erect, direct, ſouth or *north* Dial, is that deſcribed on the ſurface of the prime vertical circle, looking ſouthward or northward.

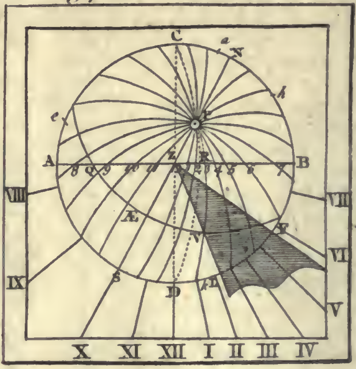
To deſcribe the hour lines upon a vertical erect, direct, ſouth or north Dial. Having drawn a right line N S, (*ibid.* n° 4. and 5.) for the meridian, or line of 12, and another at right angles E W, for the horizontal line of the plane, croſſing in the point Z; upon Z as a center, deſcribe a circle N E S W repreſenting the horizon, and thereon project the ſphere. Then draw a line upon your projection to repreſent your plane. Now an erect direct plane, which beholds the ſouth, muſt needs be in the azimuth circle of eaſt and weſt, and therefore a right line drawn from eaſt to weſt ſhall repreſent your plane. Having drawn the plane upon the projection, you muſt find its pole. Now, this plane E W lying in the azimuth of eaſt and weſt, its poles muſt lie in the azimuth of north and ſouth, ſo that N is the pole of the north face of this plane, and S of the ſouth face, either of which poles are removed 90 degrees from the plane, and a line drawn from the one pole to the other, will cut the plane at right angles in Z. The next thing to be found is the elevation of the pole of the world above the plane. Now P the pole of the world is elevated above this plane E W the quantity of the arch of the meridian Z P. To find the quantity of which, take the diſtance Z P in your compaſſes, and meaſure it upon the ſcale of half tangents, and you will find it to be equal to the complement of the latitude. Then as for the hour diſtances upon the plane, they are found thus. Lay a ruler to N, the pole of the plane, and to the ſeveral points 1, 2, 3, *&c.* 11, 10, 9, *&c.* where the hour circles of the projection cut the plane, and where the ruler cuts the primitive circle make ſmall * * *; and lines drawn from the center Z, through theſe ſtars, ſhall be the true hour lines upon the dial plane. The height of the pole above the plane being equal to the complement of the latitude, take that in degrees from a ſcale of chords and ſet them from S to B, and draw a line Z B for the ſtyle, which muſt ſtand upon the meridian, and on the ſouth face muſt point downwards to the ſouth pole,

DIALS.

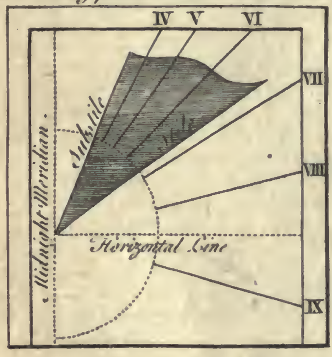
N.° 7.
West Vertical.



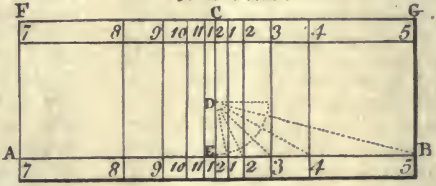
N.° 8.
Declining from South towards East.



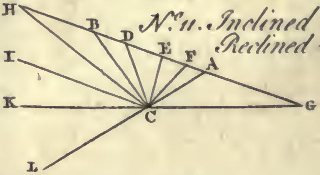
N.° 9
Declining from N.th towards East.



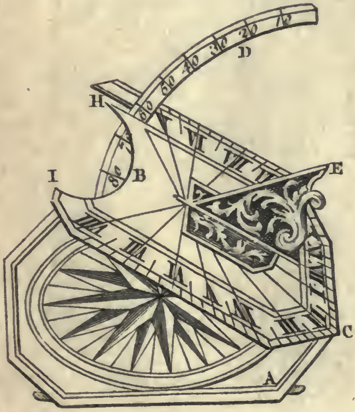
N.° 10. *Polar.*



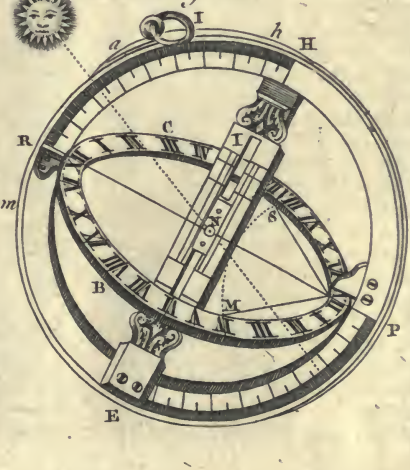
N.° 11. *Inclined & Reclined.*



N.° 12. *Universal Inclined, Horizontal, & Equinoctial.*



N.° 13. *Universal Astronomical, and Ring Dial.*



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pole, and on the north face upwards to the north pole, as in n° 5.

To draw this dial trigonometrically, ſay, as the radius to the co-ſine of the latitude, ſo is the tangent of 15° the firſt hour's equinoctial diſtance, to the tangent of the firſt hour's diſtance on the plane.

Erect, direct, eaſt or weſt Dial, that deſcribed on the plane of the meridian, looking to the eaſt or to the weſt.

To deſcribe an erect, direct, eaſt or weſt Dial. Let ABCD, plate LXX. LXXI. n° 6 and 7, be the dial plane. 1. Upon the point C at the lowermoſt corner, if it be an eaſt dial, or upon the point D, at the other lowermoſt corner, if it be a weſt dial, with 60 degrees of a line of chords, deſcribe an obſcure arch of a circle E F. Then from the ſame line of chords take the complement of the latitude of the place, which is alſo the elevation of the equinoctial above the horizon; and ſet that diſtance upon the arch from E to F, and draw the line C F A quite through the plane. This line will repreſent the equinoctial circle. 2. That you may the better proportion your ſtyle to your plane, and that all the hours may come on, and be at a convenient diſtance from one another, aſſume two points in the equinoctial line, one towards the end of C for the hour of XI, in the eaſt dial, or of I in the weſt dial, as the point G; and another towards the other end thereof, for the hour of VI, as the point H; and through theſe two points G and H, draw two lines at right angles to the equinoctial for the hour lines of XI and VI o'clock. 3. Upon the point G with 60 degrees of the line of chords, deſcribe an obſcure arch of a circle, below the equinoctial line, as I K, ſetting thereon 15° of your line of chords from I to K, and draw the obſcure line G K L extending it till it cut the hour line of VI in the point L; ſo ſhall the diſtance L H be the heighth of the perpendicular ſtyle proportioned to this plane. 4. Open your compaſſes to 60° of your line of chords, and ſetting one foot in the point L with the other, deſcribe an obſcure arch of a circle M N between the hour line of VI and the line G L. 5. Divide the arch M N into five equal parts, at the points ⊙ ⊙ ⊙ ⊙ ⊙, and lay a ruler from L to each of theſe points, and the ruler will cut the equinoctial line C H in the points * * * *, through which points draw right lines parallel to the hour line of VI, as the lines VII * VII, VIII * VIII, IX * IX, X * X, and they will be the true hour lines of an eaſt dial from ſix in the morning to eleven before noon. 6. For the hour lines before VI, namely, of IV and V in the morning, you may put them on by transferring the ſame diſtances upon the equinoctial line before VI, as there is between VI, and the hour lines of VII and VIII, after VI. and through theſe points draw lines parallel to the hour line of VI, and they will be the hour lines of IV and V in the morning. 7. For the ſtyle of eaſt or weſt dials it may be either a ſtraight pointed pin or wire exactly of the length of the line H L, fixed in the point H, or ſome other part of the line of VI, perpendicularly to the plane, which will ſhew the true hour only by the ſhadow of the very top, as in the weſt dial n° 7; or, which is better, it may be a plate of braſs of the ſame breadth with the diſtance between the hour lines of VI and IX upon the equinoctial, as in the eaſt dial n° 6, which plate being ſet perpendicularly upon the hour line of VI, will ſhew the hour by the ſhadow of the upper edge. 8. If you would inſert the halves and quarters of hours, divide each ſpace between ⊙ and ⊙ on the arch M N into four equal parts, and ſo transfer them to the equinoctial circle, as you did the whole hours. In an eaſt and weſt dial every thing is the ſame, with this difference only, that whereas the arch E F in the eaſt dial, through which the equinoctial paſſes, was deſcribed on the right hand of the plane upon the center C; in the weſt dial it muſt be deſcribed on the left hand on the center D; and the hour lines of IV, V, VI, VII, VIII, IX, X, XI in the forenoon on the eaſt dial, muſt be VIII, VII, VI, V, IV, III, II, I in the afternoon on the weſt dial.

Polar Dial, that deſcribed on a plane paſſing through the poles of the world, and the eaſt and weſt points of the horizon, denominated *upper* or *lower*, according as it looks up towards the zenith, or down towards the nadir. It is therefore inclined to the horizon in an angle equal to the elevation of the pole.

To draw an upper polar Dial. Draw a right line A B (n° 10) parallel to the horizon; and if the plane be inmoveable,

able, find the meridian line CE. Divide CE into two equal parts, and thro' C draw a right line FG parallel to AB. Then from the center D, with the interval DE, deſcribe a quadrant, which divide into ſix equal parts; and from the center D, through the ſeveral points of diviſion, draw right lines D 1, D 2, D 3, D 4, D 5, and ſet off the intervals E 1, E 2, E 3, E 4, E 5, contrary way, *viz.* E 11, 10, 9, 8, 7. From the points 5, 4, 3, 2, 1, raiſe perpendiculars, meeting the line FG in the correſpondent points. Laſtly, in D erect a perpendicular ſtyle equal to DE, or on two equal pieces; E, C, fix a croſs iron rod, then will 12, 12; 1, 1; 2, 2; 3, 3, *&c.* be hour lines to be pointed out at the proper times by the ſhadow of the indices. A lower polar dial is made by putting out the hours of the forenoon 9, 10, 11, and thoſe of the afternoon 1, 2, 3, with the noon-hour 12 itſelf, and only leaving the hours 4 and 5 in the morning and 7 and 8 in the afternoon.

Secondary Dial, that drawn on the plane of other circles than the horizon, prime vertical, equinoctial, and polar circles; or that which either declines, inclines, reclines, or deinclines.

Declining Dials are erect or vertical dials, which cut either the plane of the prime vertical, or of the horizon at oblique angles. They are of very great uſe, as the walls of houſes, upon which dials are frequently drawn, commonly deviate from the cardinal points.

To deſcribe a vertical Dial, *declining from the ſouth to the eaſt, or weſt, trigonometrically.* In order to do this, 1. The height of the pole or ſtyle above the plane muſt be found. 2. The deflexion or ſubſtyle's diſtance from the meridian. And 3. The plane's difference of longitude. All which are parts of the ſpherical triangle PRZ, (n° 8.) right angled at R, in which are given the ſide PZ, equal to the complement of the latitude of the place; the angle PZR, the complement of the plane's declination; and the right angle at R. From theſe three data are found. 1. The height of the ſtyle above the plane by this canon.

As the ſine of 90°
Is to the ſine complement of the latitude,
So is the ſine complement of the plane's declination
To the ſine of the height of the ſtyle.

2. The diſtance of the ſubſtyle from the meridian by this canon.

As the ſine of 90°
To the ſine of the plane's declination,
So is the tangent of the complement of the latitude of the place
To the tangent of the ſubſtyle's diſtance from the meridian.

3. To find the plane's difference of longitude, ſay,

As the ſine of the complement of latitude
To the ſine of 90°,
So is the ſine of the ſubſtyle's diſtance from the meridian
To the ſine of the plane's difference of longitude.

4. To find the angle that each hour makes with the ſubſtyle, ſay,

As the ſine of 90°
To the ſine of the height of the pole above the plane,
So is the tangent of the difference of the ſun's diſtance from the meridian and the difference of longitudes
To the tangent of the angle required.

An example of a north dial declining eaſt, which is only a ſouth dial inverted, may be ſeen in (n° 9.)

Inclined Dials are thoſe delineated on planes inclining towards the ſouthern ſide of the horizon in an angle either greater or leſs than the equinoctial plane.

To draw an inclined Dial. The inclination of the plane, as DC, (n° 11.) being found by a declinator, as taught under the article Declinator, if it fall between the equinoctial plane CE, and the vertical one CB, ſo as that the angle of inclination DCA be greater than the elevation of the equator ECA, on the upper ſide draw a *north* dial, and on the lower a *ſouth* dial to an elevation of the equator, which is equal to the aggregate of the elevation of the equator of the given place, and the complement of the inclination to a quadrant. If the inclined plane CF fall between the horizontal one CA, and the equinoctial one CE, ſo as that the angle of inclination FCA is leſs than the elevation of the equator ECA, deſcribe an horizontal dial to an elevation of the pole equal to the aggregate of the elevation of the pole of the given place, and the inclination of the plane. See the article *Horizontal*-Dial.

Inclined dials are drawn after the ſame manner as primary dials, except that the index in the former caſe muſt be fitted under the angle A D C, and in the latter, under the angle D F C, and that the diſtance of the center of the dial from the line of contingency is in the former caſe D C, and in the latter F C.

Reclining DIALS, thoſe delineated on planes reclining backwards from the zenith towards the north, in an angle greater or leſs than the polar plane.

To deſcribe a reclining DIAL. If the reclined plane H C, (nº 11.) fall between the vertical plane B C, and the polar plane I C, ſo as that the angle of reclination B C H is leſs than the diſtance of the pole from the zenith B C I, deſcribe two vertical ſouth and north dials to an elevation of the equator equal to the difference between the elevation of the equator of the given place, and the angle of reclination. See *vertical, ſouth and north* DIAL.

If the reclined plane, as K C, fall between the polar plane I C, and the horizontal one C L, ſo as that the angle of reclination B C K is greater than the diſtance of the pole from the zenith I C B, deſcribe an horizontal dial thereon to an elevation of the pole equal to the difference between the angle of reclination, and the elevation of the equator of the given place. See *Horizontal* DIAL.

De-inclined DIALS are thoſe which both decline and incline, or recline. The uſe of theſe being very rare, we ſhall not trouble the reader with a deſcription of them.

Conſtruction of an univerſal inclined, horizontal and equinoctial DIAL. This inſtrument conſiſts of two plates of braſs, or other ſolid matter, whereof the under one A (nº 12.) is hollowed about the middle, to receive a compaſs faſtened underneath with ſcrews. The plate B is moveable by means of a ſtrong joint at C. Upon this plate is drawn a horizontal dial for ſome latitude greater than any of thoſe the dial is to be uſed in, with a ſtyle E proportionable to that latitude. For when the plane B is raiſed by means of the quadrant D, the horizontal plane muſt always have a leſs latitude than that the dial is made for, otherwiſe the axis of the ſtyle will have an elevation too little. Inſtead of the quadrant D is generally placed an arch from the equator to 60° numbered downwards, 60 being at the bottom, and for this latitude of 60°, the horizontal dial is commonly drawn. The arch of 60° is faſtened by two ſmall tenons, and may be laid down upon the plate A, as likewiſe may the ſtyle upon the plate B, and both of theſe are kept upright by means of little ſprings underneath the plates.

The uſe of the inclined horizontal DIAL. Raiſe the upper plate B to the degree of latitude of the place where you are, by means of the gradations on the quadrant D. Then if the plane A be ſet horizontal, ſo that the needle of the compaſs ſettles over its line of declination, the ſhadow of the axis will ſhew the hour of the day.

Uſe of the equinoctial DIAL. You muſt place the edge of the equinoctial circle H B I to the degree of the elevation of the pole by means of the quadrant, and if the dial be ſet north and ſouth by means of the compaſs, the ſhadow of the ſtyle will ſhew the hour of the day at all times of the year, even when the ſun is in the equinoctial, becauſe the circle is hollowed.

Ring DIAL, a kind of dial, conſiſting of a braſs ring, ſeldom exceeding two inches in diameter, and one third of an inch in breadth. In a point of this ring there is a hole, through which the ſun beams being received, make a lucid ſpeck on the concavity of the oppoſite ſemicircle, which gives the hour of the day in the diviſion marked therein. But it only holds good about the times of the equinox, unleſs the hole is made moveable, and the days of the month are marked on the convex ſide of the ring. In this caſe the dial can be rectified for any time, and will ſhew the hour of the day throughout the year.

To uſe it, put the moveable hole to the day of the month, then ſuſpending it by the little ring, turn it towards the ſun till his rays point out the hour among the diviſions on the inſide.

Univerſal or aſtronomical ring-DIAL, a dial ſerving to ſhew the hour of the day in any part of the earth; whereas the former is confined to a certain latitude. It is compoſed of two rings, or flat circles, from two to ſix inches in diameter, and their breadth proportional. The outward ring H R E P (plate LXXI. fig. 13.) repreſents the meridian of the place of the obſerver, and contains two diviſions of 90° each, as H R and E P diametrically oppoſite to each other, the one ſerving from the equator to the north pole, and the other from the equator to the ſouth. The inner ring B C repreſents the equator, and turns exactly within the outward ring, by means of two pivots at the points of the hours of 12. A curſor N compoſed of two little pieces, ſlides along an aperture, in the middle of the bridge I, which curſor has a ſmall hole to admit the rays of the ſun. The middle of this bridge repreſents the axis of the world, and its two extremities the two poles; on one ſide of it are drawn the ſigns of the zodiac, and on the other, the days of the month. On the edge of the meridian ſlides a piece *h a*, with a ring I, fitted to it, by which the inſtrument is to be ſuſpended during the obſervation. This ring repreſents the zenith.

Uſe of the univerſal ring-DIAL. Place the line on the middle of the ſliding piece, immediately below the ring, to the latitude of the place, and fix the line croſſing the hole of the curſor to the day of the month, or degree of the ſign in which the ſun then is. Open the inſtrument ſo, that the two rings be at right angles to each other, and ſuſpend it by the ring I: turn the flat ſide of the bridge towards the ſun, ſo that his rays coming through the little hole in the middle of the curſor fall exactly on a line drawn round the middle of the concave ſurface of the interior ring, where it will point out the hour. Let it be obſerved, however, that this dial will not ſhew the hour of 12, becauſe the outer circle being then in the plane of the meridian, hinders the ſun's rays from falling on the inner. Neither will it ſhew the hour when the ſun is in the equinoctial, for then his rays fall parallel to the plane of the inner circle.

Quadrantal DIAL, or HORODICTIC QUADRANT. See the article QUADRANT.

Reflecting DIAL, a ſort of dial ſhewing the hour of the day by means of a thin piece of looking-glaſs plate, ſo placed, as to reflect the ſun's rays on the top of a ceiling, where the hour-lines are drawn.

Nocturnal DIAL, that which ſhews the hours of the night, of which there are two kinds, lunar and ſidereal.

Lunar, or moon-DIAL, ſhews the hour of the night by means of the ſhadow of the moon, projected from an index.

To deſcribe a horizontal moon-DIAL. Dra
firſt a horizontal ſun-dial. 2. Erect tw
lines A B, C D, (plate LXXII. fig. 1.
perpendicular to the line of 12 o'clock
and dividing the interval G F into twel
equal parts, draw lines parallel throug
the ſeveral points of diviſion. 3. If th
firſt line C D be appropriated to the da
of the new moon, and the ſecond li
to the day when the moon comes lat
to the meridian than the ſun by o
hour, and ſo the laſt line A B corr
ſpond with the day of full-moon, t
interſections of theſe lines with the hou
lines will give points, through whi
to draw a curve line, 12, 12, for t
meridian line of the moon. 4. In t
ſame manner determine the other ho
lines 1, 1; 2, 2; 3, 3, &c. which t
ſhadow of the moon projected from t
ſtyle of the dial, interſects at the r
ſpective hours. 5. Blot out the ho
lines of the ſun-dial, together with t
perpendiculars, by means of which t
lunar hours were drawn, and divi
the interval G F by other parallel li
into fifteen equal parts, becauſe the
are nearly fifteen days between n
moon and full moon. Laſtly, to th
lines write the ſeveral days of t
moon's age. Now the moon's age b
ing learnt from the calendar, the int
ſection of the line of the moon's a
with the lunar horary lines, will give t
hour of the night.

We may likewiſe find the hour of
night by a ſun-dial. Thus, obſerve
hour which the ſhadow of the ind
points at by moon-light: find the moo
age in the calendar; multiply the nu
ber of days by $\frac{3}{4}$ and the product is
number of hours to be added to the h
ſhewn by the ſhadow, to give the h
required. But if this number exceed
then twelve hours are to be ſubtract
and the remainder will be the hour
quired.

DIALS *without centers*, thoſe whoſe ho
lines converge ſo ſlowly, that the ce
they converge towards cannot be
preſſed on the given plane. Horizo
dials of this kind are to be made
places, the elevation of whoſe pole
either very great or very ſmall; and
tical dials without centers are for pla
which have the pole very much
vated.

Furniture of DIALS. See FURNITURE

DIALECT, διαλεκτος, an appella
given to the language of a province,

Fig. 1. MOON-DIAL.

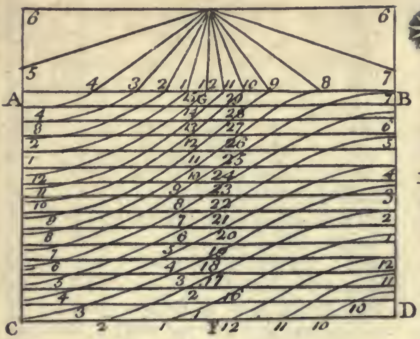
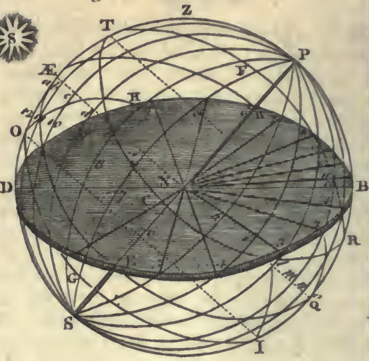
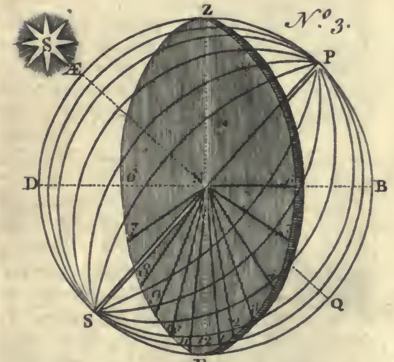


Fig. 2. DIALLING. *N.º 1.*



N.º 3.



N.º 2.

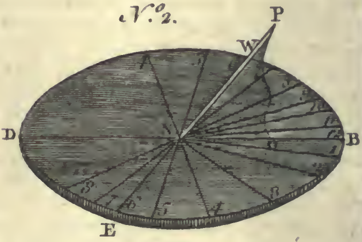


Fig. 3 DIAMETER.

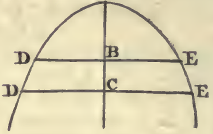


Fig. 4. DIANTHUS, the *PINK*.

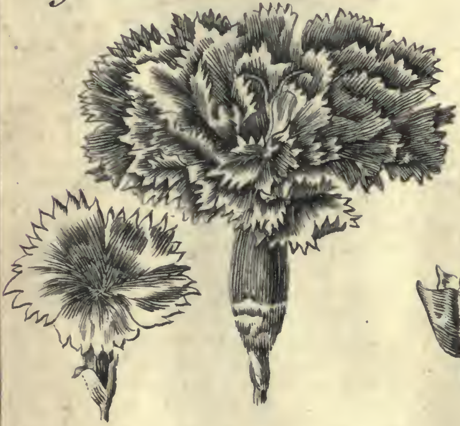


Fig. 5. DICTAMNUS.

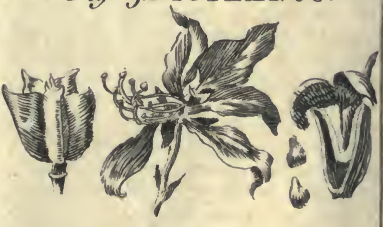
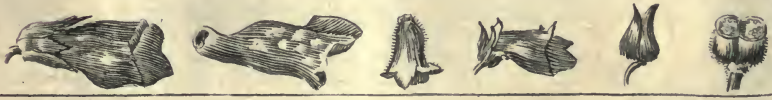


Fig. 6. DIGITALIS, *FOX-GLOVE*.



T. Jefferys sculp

ſo far as it differs from that of the whole kingdom. The term, however, is more particularly uſed in ſpeaking of the antient greek, whereof there were four dialects, the attic, ionic, æolic, and doric, each of which was a perfect language in its kind, that took place in certain countries, and had peculiar beauties.

In Great Britain, beſides the grand diverſity of engliſh and ſcotch, almoſt every county has a dialect of its own, all differing conſiderably in pronunciation, accent, and tone, altho' one and the ſame language.

The way of the Gileadites proving the Ephraimites, by the pronunciation of *ſchibboleth*, or *ſibboleth*, with *ſchin*, or *ſamech*, is well known. So the Flemings are ſaid to prove whether a man be a native of France, or not, by bidding him pronounce *ach ten tachtentick*, which they pronounce *act en tactentick*, as being unable to articulate the aſpirate *ch*.

DIALECTICS, *dialectica*, in the literary hiſtory of the antients, that branch of logics which taught the rules and modes of reaſoning. See the article LOGIC.

DIALIA, and FLAMEN DIALIS, in roman antiquity. See FLAMEN.

DIALLING, the art of conſtructing all manner of dials. See DIAL.

Having deſcribed the moſt uſeful dials under the word DIAL, we now proceed to explain the philoſophic principles of the art of dialling. In order to this, therefore, we are to conſider, that as the time which paſſes between any meridian's leaving the ſun, and returning to it again, is divided into 24 hours, ſo if we conceive a ſphere to be conſtructed with 24 of theſe meridians, the ſun will orderly come upon one of them at the beginning of every hour. Such a ſphere may be repreſented by the figure P D S B (plate LXXII. fig. 2. nº 1.) where the ſeveral meridians are repreſented by P 1 S, P 2 S, P 3 S, and ſo on to 24 in all: ſince theſe meridians divide the equinoctial into 24 equal parts, each part will contain juſt 15°, becauſe 15×25=360, the whole circle; and ſince all the meridians paſs through the poles of the world, the planes of thoſe meridians all interſect each other in one common line P S, which is the axis of the ſphere, therefore the ſaid axis P S is in the plane of each of the 12 meridians. Suppoſe Z to be the zenith of any place, and D W B E the plane of the horizon fixed within the ſphere, conſtructed with the 12 meridians, 1, 1; 2, 2; 3, 3; 4, 4; &c. then will the axis of the ſphere P S paſs through the center of the plane at N; ſo that one half N P will be above the plane, and the other half N S below it. Suppoſe now this dialling ſphere to be ſuſpended by the point Z, and moved about ſo as to have the points D and B exactly in the ſouth and north points of the horizon, and E and W in the eaſt and weſt points, then will the ſphere have a ſituation every way ſimilar to that of the earth and heavens with reſpect to the given place, and the axis of the ſphere to that of the earth. The ſun, therefore, ſhining on ſuch a ſphere, will be attended with all the ſame incidents, and produce all the ſame effects as would happen if the ſaid ſphere were at the center of the earth, or the center N of the ſphere coincided with the center of the earth, becauſe the diſtance between the ſurface and center of the earth is inſenſible at the diſtance of the ſun. Now it is evident, as the ſun revolves about ſuch a ſphere, it will every hour be upon one half or other of the 12 hour circles, *viz.* from midnight to noon, it will be on thoſe parts of the circles which are in the eaſtern hemiſphere; and from noon to midnight, it will paſs over all thoſe in the weſtern. It is alſo farther evident, that while the ſun is in the eaſtern hemiſphere, it will be firſt below and then above the plane of the horizon, and *vice verſa* on the other ſide. Again, when the ſun is upon any of theſe hour circles, by ſhining upon the axis it cauſes it to caſt a ſhadow on the contrary ſide, on the plane of the horizon, on the lower or upper ſurface, as it is below or above the ſaid plane. This ſhadow of the axis will be preciſely in the line in which the plane of the hour-circle would interſect the plane of the horizon: if, therefore, lines were drawn through the center N, joining the points on each ſide the plane where the hour-circles touch it, as 4 N 4, 5 N 5, 6 N 6, &c. the ſhadow of the axis will fall on thoſe lines at the beginning of each reſpective hour, and thereby indicate the hour-circle the ſun is in for every hour of the day. Theſe lines are properly called hour lines, and among the reſt that which repreſents the hour of 12 at noon is N B, half the meridian line D B; whence it appears that the hour-lines N 1, N 2, N 3, &c. which ſerve for the afternoon, lie on the eaſt ſide of the plane, and are numbered from the north to the eaſt; and on the contrary.

It alſo appears, that as the ſun's altitude above the plane is greater or leſs, the number of hour-circles the ſun will poſſeſs above the horizontal plane will be alſo greater or leſs. Thus when the ſun is at S in the equinoctial, its diurnal path for that day being the equinoctial circle itſelf ÆEQW, it is plain, ſince the arch ÆE = EQ, the ſun will apply to ſix hour-circles below the horizon, and to ſix above it, in each half of the day; and conſequently that on this day the ſhadow will occupy but 12 of the hour-lines on each ſurface of the plane, beginning and ending at ſix. But when the ſun is in the tropic of cancer, its diurnal path for that day being the tropic itſelf, TCRF, it is manifeſt the ſun in the forenoon aſcends above the plane in paſſing between the hour-circles of 3 and 4 in the morning, and deſcends below it in the afternoon between the hours of 8 and 9: therefore on the ſummer tropic the ſhadow will paſs over 16 of thoſe hour-lines. On the contrary, when the ſun is in the winter tropic at O, its path being then OGIH, it riſes above the plane between 8 and 9, and leaves it between 3 and 4.

From what has been ſaid, it is evident that if the circles be ſuppoſed removed, and only the horizontal plane remain, with the half of the axis N P, (*ibid.* n° 2.) above it in the ſame poſition as before, then ſhould we have conſtituted a horizontal dial, every way the ſame with thoſe in common uſe, with only the addition of a ſubſtyle P O, to render the ſtyle N P very firm. Hence appears the reaſon why the gnomon or ſtyle N P, in thoſe dials in our latitude, is always directed to the north pole, and always contains ſuch an angle P N O, with the hour line of 12, N B, as is equal to the latitude of the place. Laſtly, the reaſon appears why the number of hour lines on theſe dials exceeds not 16, and are all drawn from 6 to 12 and 6 again, on the northern part, the reſt on the ſouthern; and why the hour line of 6 lies directly eaſt and weſt, as that of 12 does north and ſouth.

If a plane be fixed within the ſame ſphere in a vertical poſition, or perpendicular to the horizon, and coinciding with the plane of the prime vertical, that is, facing full ſouth and north; then will the axis P S (*ibid.* n° 3.) ſtill paſs through the center of the plane N; and the lower ſemi-axis N S will by its ſhadow mark out the hour-lines on the ſouthern ſurface, and the upper ſemi-axis N P will do the ſame on the northern. Theſe hour-lines are determined in the ſame manner as thoſe on the horizontal dial; and it is plain the ſun cannot come on the ſouthern face of this plane before ſix in the morning, nor ſhine on it after ſix in the evening. It is alſo evident, that all the hours before ſix in the morning, and after 6 at night, will be ſhewn on the northern face or ſide of this plane, for the time of the ſun's being above the horizon in any place. Hence the reaſon of a direct ſouth and north vertical dial eaſily appears, both which are repreſented in fig. 3. n° 4 and 5 of plate LXX.

The gnomon NS (pl. LXXII. fig. 2. n° 3.) contains an angle SNF = ZNP with the meridian or hour-line of 12, *viz.* ZF, which is exactly the complement of PNB to 90°; hence the elevation of the gnomon in vertical dials is equal to the complement of the latitude of the place. The principles of a direct ſouth dial being underſtood, it will be eaſy to underſtand thoſe of a dial which does not face the ſouth or north directly, but declines therefrom any number of degrees from eaſt to weſt. But we refer the reader, who requires more ample inſtruction on this head, to the authors who have treated profeſſedly of dialling; the moſt remarkable of theſe, beſides Wolfius, to whom we are indebted for a great part of the article Dial, are Clavius; Comandine, De Horologiorum deſcriptione; Joann. Bapt. Benedictus, De Gnomonum Umbrarumque ſolarium uſu; Geo. Schomberg, Exegeſis fundamentorum; Gnomonicorum; Solomon de Caus, Traite des Horologes ſolaires; Deſargues, Maniere univerſelle pour poſer l'eſſieu, & placer les heures, & autres choſes, aux cadrans ſolaires; Kircher's Ars magna Lucis & Umbræ; Leybourn's Art of Dialling; Ozanam's Dialling; and M. De la Hire's Gnomonique, ou l'art de tracer les cadrans, avec les demonſtrations.

DIALLING-GLOBE, an inſtrument of braſs or wood, with a plane fitted to the horizon, and an index, ſo contrived as to give a clear illuſtration of the principles on which dials are made. See the preceding article.

DIALLING-LINES, or SCALES, are graduated lines placed on rulers, or the edges of quadrants and other inſtruments, to expedite the conſtruction of dials. Theſe are, 1. A ſcale of ſix hours, which is only a double tangent, or two lines of tangents each of 45°, ſet together in the middle, and equal to the whole line of ſines, with the declination ſet againſt the meridian altitudes in the latitude of the place. 2. A line of latitudes, which is fitted to the hour-ſcale, and is made by this canon. As the radius : to the chord of 90° : : ſo are the tangents of each reſpective degree of the line of latitudes: to the tangents of other arcs. And then the natural ſines of theſe arches are the numbers, which taken from a diagonal ſcale of equal parts, ſhall graduate the diviſions of the line of latitudes to any radius. The lines of hours and latitudes are general, for pricking down all dials with centers.

The other ſcales are particular, and give the ſeveral requiſites for all upright declining dials by inſpection. They are, 1. A line of chords. 2. A line for the ſubſtyle's diſtance from the meridian. 3. A line for the ſtyle's height. 4. A line of the angle of 12 and 6. 5. A line of inclination of meridians.

Dialling sphere, an inſtrument made of braſs, with ſeveral ſemi-circles ſliding over each other upon a moveable horizon; ſerving to demonſtrate the nature of ſpherical triangles, as well as to give the true idea of drawing dials on all ſorts of planes. See the article Dialling.

Dialling, among miners, the ſame with plumming. See Plumming.

DIALOGISM, διαλογισμὸς, in rhetoric, is uſed for the ſoliloquy of perſons deliberating with themſelves, as the following of Juno, in the firſt Æneid of Virgil:

mene incepto deſiſtere victam?
Nec poſſe Italia Teucrorum avertere regem?
Quippe vetor fatis? &c.

In this ſenſe, it is diſtinguiſhed from dialogue. See the article Dialogue.

Dialogism is alſo, in a more extenſive ſenſe, taken for diſcourſe in general, whether held by a perſon alone, or in company.

DIALOGUE, in matters of literature, a converſation between two or more perſons, either by writing or by word of mouth.

Dialogue appears to be the moſt antient form of writing, and is greatly recommended by ſeveral authors. The archbiſhop of Cambray, at the head of his Paſtoral Inſtruction, gives an account of the advantages of dialogue. The Holy Spirit has thought proper to teach us in dialogue, *viz.* patience, in the book of Job; and love of God, in the Canticles. The Dies Caniculares of Simon Maiolus, concerning various ſubjects of nature, is by the way of dialogue. That learned philoſopher Claud Berirgardus, a man of moſt profound judgment and ingenuity, wrote his Circulus Piſanus, wherein he lays open the moſt impenetrable ſecrets of all natural philoſophy, by way of dialogue between Charilæus, as defender of the peripatetics, and Ariſtæus, as maintaining the principles of Anaximander. Alſo Joh. Bodinus, in his Phyſics, as well as in all the reſt of his writings, treats, in his Theatrum univerſæ naturæ, of the various ſubjects of nature, in the form of a dialogue: and indeed under this appearance, and in this method of ſtyle, he has better opportunities, by way of objections, to introduce his own paradoxes, and the reſt of his monſtrous opinions. We have alſo ſeveral writers of travels, *&c.* in this way, both in the french and german languages; and not a few medical and chemical authors, who have choſe to inſtruct by way of dialogue.

Among religious writers, Juſtin Martyr opened this way in his controverſy againſt the Jews. Minutius Felix followed it, in his againſt the idolaters. It is in this form that Origen judged he could beſt refute the error of Marcian. Many others might be mentioned who thought it no diminution to the majeſty of the myſteries of faith, to maintain them by the familiarity of dialogue.

Dialogue, in muſic, a compoſition for at leaſt two voices, or two inſtruments, which anſwer one another, and which frequently uniting at the cloſe, make a trio with the thorough baſs.

Theſe are very much uſed by the Italians in their operas, oratorios, ſerenatas, *&c.*

DIALTHÆA, in pharmacy, an unguent much uſed as a reſolvent, ſo called from althæa, or marſh-mallows, which is the principal ingredient in it. See the article Althæa.

This ointment conſiſts alſo of linſeed and fenugreek ſeed; the other ingredients are common oil, wax, reſin, and turpentine. It is applied by rubbing it on the part affected.

DIALYSIS, in grammar, a mark or character, conſiſting of two points, ¨, placed over two vowels of a word, in order to ſeparate them, becauſe otherwiſe they would

would make a diphthong, as moſaïc, *&c.* See the article DIÆRESIS.

DIAMARGARITON, in pharmacy, the name of an antidote in Myrepſus, §. i. cap. 37. in which pearls are a principal ingredient.

There are two kinds of the diamargariton, the hot and the cold, but neither of them are at preſent uſed.

The hot diamargariton, is a powder compoſed of pearls, pellitory, ginger, cinnamon, and ſeveral other hot ingredients.

Cold diamargariton is a ſolid electuary, compoſed of pearls ground fine, and white ſugar diſſolved in roſe-water, or that of bugloſs, and boiled to a conſiſtence.

Compound cold diamargariton is a powder made of pearls, red roſes, flowers of nenuphar and violet, lignum aloes, red and citron ſantal, tormentil root, *&c.*

DIAMASTIGOSIS, διαμαςίγωσις, in grecian antiquity, a ſolemnity at Sparta, in honour of Diana Orthia, wherein the children of the moſt diſtinguiſhed families were wont to ſlaſh and tear each others bodies with rods, before the altar of the goddeſs: the parents of the children, being always preſent, uſed to animate and excite them not to give the leaſt ſign of pain or concern; and indeed ſo great was the bravery and reſolution of the boys, that ſeldom or ever any cry or groan was heard to proceed from any of them, though they frequently whipped one another to death. The deſign of this cuſtom was, no doubt, to fortify the children betimes, and harden them againſt wounds, bruiſes, *&c.*

DIAMETER, in geometry, a right line paſſing through the center of a circle, and terminated at each ſide by the circumference thereof. See the article CIRCLE.

The chief properties of the diameter are, that it divides the circumference of a circle into two equal parts: hence we have a method of deſcribing a ſemicircle upon any line, aſſuming its middle point for the center. The diameter is the greateſt of all chords.

For finding the ratio of the diameter to the circumference, ſee CIRCLE.

DIAMETER *of a curve* is a right line A C (plate LXXII. fig. 3.) biſecting the right lines D E, D E, drawn parallel to one another; and are either of a finite or infinite length. Though a right line, biſecting all parallel lines drawn from one point of a curve to another, is taken in a ſtrict ſenſe only for the diameter of a curve line, yet it may not be amiſs, more generally, to define a diameter, in ſaying that it is that line, whether right or curve, which biſects all parallels drawn from one point of a curve to another, ſo that, according to this, every curve will have a diameter: and thence ſir Iſaac Newton's curves of the ſecond order have all either a right-lined diameter, or elſe the curves of ſome one of the conic ſections for diameters: and many geometrical curves of the higher orders may alſo have for diameter curves of more inferior ones, and that *ad infinitum.* See the articles CURVE and CONIC SECTIONS.

DIAMETER CONJUGATE. See the article CONJUGATE DIAMETER.

DIAMETER *of a ſphere* is the diameter of the ſemicircle, by whoſe rotation the ſphere is generated; in which ſenſe it is the ſame with axis. See the article AXIS.

DIAMETER *of gravity*, in any ſurface or ſolid, is that line in which the center of gravity is placed. See CENTER.

DIAMETER, in aſtronomy. The diameters of the planets are either apparent or real: the apparent diameters are ſuch as they appear to the eye; and being meaſured by a micrometer, are found different in different circumſtances and parts of their orbit. See the article PLANET.

The apparent diameters of the planets meaſured with a micrometer, are found different in different circumſtances and parts of their orbits, as expreſſed in the following table.

Apparent Diameters of the Planets.

		Leaſt.			Mean.			Greateſt.		
According to De la Hire	Sun	31′	38″	0‴	32′	1″	0‴	32′	43″	0‴
	Moon	29	30	0	31	30	0	33	30	0
According to Hevelius	Saturn	0	14	10	0	16	2	0	19	40
	Jupiter	0	14	36	0	18	2	0	24	22
	Mars	0	2	46	0	5	2	0	20	50
	Venus	0	9	30	0	16	46	1	5	58
	Mercury	0	4	4	0	6	3	0	11	48

The leaſt apparent diameter of the planets, according to Huygens, are as follows: Saturn 30″, his ring 1′ 8″, Jupiter 1′ 4″, Mars 30″, Venus 1′ 25″.

The real diameters of the planets are ſuch as they are in themſelves, and are laid down by aſtronomers, as expreſſed in the following table.

A Table of the real Diameters of the Sun and primary Planets in Britiſh Miles.

The diameter of	the Sun	763,460	britiſh miles.
	Mercury	4,240	
	Venus	7,906	
	the Earth	7,970	
	Mars	4,444	
	Jupiter	81,155	
	Saturn	67,870	

For the real diameters of the ſecondary planets, ſee MOON and SATELLITE.

DIAMETER *of a column*, in architecture, is its thickneſs juſt above the baſe. See the article COLUMN.

From this the module is taken, which meaſures all the other parts of a column. See the article MODULE.

DIAMETER *of the diminution of columns*, that taken from the top of the ſhaft. See the article DIMINUTION.

DIAMETER *of the ſwelling*, that taken at the height of one third from the baſe.

DIAMOND, *adamas*, in natural hiſtory, a genus of precious ſtones, of a fine pellucid ſubſtance, of great hardneſs, never fouled by any admixture of earthy or any other coarſe matter, ſuſceptible of elegant tinges from metalline particles, giving fire with ſteel, not fermenting with acid menſtruums, ſcarcely calcinable by any degree of fire, and of one ſimple and permanent appearance in all lights.

This is the moſt valuable and hardeſt of all gems, and, though found of different ſhapes, and ſometimes accidentally tinged to ſeveral colours; yet ever carries the ſame diſtinguiſhing characters, and is very evidently in all thoſe ſtates the ſame body. It is, when pure, perfectly clear and pellucid as the pureſt water, and is eminently diſtinguiſhed from all other ſubſtances, by its vivid ſplendor, and the brightneſs of its reflections. It is extremely various in ſhape and ſize, being found in the greateſt quantity very ſmall, and the larger ones extremely ſeldom met with; the largeſt diamond certainly known ever to have been found is that in the poſſeſſion of the Great Mogul, which weighs 279 carats, and is computed to be worth 779,244 l.

The diamond has certainly one proper and determinate figure, into which it naturally muſt concrete, when in a ſtate of reſt, and impeded by no other accident in its formation: the true figure then is an inequilateral octohedron; and wherever it has concreted in a perfect manner, and without any interrupting accidents, it has always formed itſelf into this figure; and often in this its ſeveral ſurfaces are as bright as if poliſhed by art: but, as in common ſalt, though its figure be pyramidal, yet very eaſy accidents can determine it into cubes and parallelopipeds; ſo the diamond has often, in the ſtate of formation, been thrown into two other figures, both alſo ſeeming regular ones; the one a priſmatic columnar one, of ſix angles ſomewhat emulating the figure of cryſtal, the other an oblong quadrilateral column with two truncated ends: theſe ſeem the only regular figures of this gem; but beſides theſe it is every day found in numberleſs other miſ-ſhapen forms, often roundiſh, emulating the ſhape of pebbles, but full of ſmall flat planes or faces; frequently oblong, very often flat, and as often tapering, either from one end to the other, or elſe from the middle to both ends. A diamond bears the force of the ſtrongeſt fire, except the concentrated ſolar rays, without hurt, and even that infinitely fierceſt of all fires does it no injury, unleſs directed to its weaker parts.

It is a common thing for diamonds to be too thick or deep for the extent of their ſurface, and there is a certain proportion of depth, beyond which the gem ſhould not be allowed: in this caſe two diamonds are often made, by the regularly dividing one: this, when the maſs is of an angular figure, is done by cutting it through with a wire, wetted with oil, and covered with diamond-powder; but in the flat or more common maſſes, it is done much more expeditiouſly by finding the grain of the ſtone, and introducing the point of a fine flat chiſſel between them. This is not the only uſe of the ſpliting, for when a diamond has a flaw or blemiſh in it, which greatly debaſes its value, the plates may be ſeparated at a proper breadth, and the flaw removed; in which caſe the thinner cruſt, ſtruck off, is of value in proportion to its ſize, and the remainder, being now freed from its flaw, is of much more value than it was at firſt.

The places whence we have the diamonds are the Eaſt Indies, in the iſland of Borneo, and in the kingdoms of Viſapour, Golconda, Bengal; and the Braſils in the Weſt-Indies. They are not unfrequently found yellowiſh, blueiſh, and reddiſh, but more rarely greeniſh.

There have not been wanting people who have attributed to the diamond great virtues as a cordial; but we are apt to believe no body ever did, or will, try whether this has been ſaid with any ſort of foundation.

Valuation of **DIAMONDS**, among jewellers, is thus calculated: they ſuppoſe the value of a rough diamond to be 2 l. per carrat; then to find the value of thoſe of greater weight, they multiply the ſquare of their weight by 2, and this laſt product is the value of the diamonds in their rough ſtate: thus, the value of a rough diamond weighing 4 carats, is equal $4\times4\times2=16\times2=32$ l. and ſo in other caſes. Again, to find the value of wrought diamonds, they ſuppoſe half their weight loſt in the manufacturing them, and therefore multiply the ſquare of double their weight by 2; thus the value of a wrought diamond, weighing 3 carrats, is equal $6\times6\times2=36\times2=72$ l.

Corniſh **DIAMOND**, in natural hiſtory, a name given to a kind of cryſtals, from their being found in Cornwall. See the article CRYSTAL.

Rough **DIAMOND** is the ſtone as nature produces it in the mines.

Roſe-**DIAMOND** is that quite flat underneath, with its upper part cut in divers little faces, uſually triangles, the uppermoſt of which terminate in a point.

Table-**DIAMOND** is that which has a large ſquare face at top, encompaſſed with four leſſer.

Brilliant **DIAMOND** is that cut in faces both at top and bottom; and whoſe table or principal face at top, is flat.

DIAMOND, in the glaſs trade, an inſtrument uſed for ſquaring the large plates or pieces; and, among glaziers, for cutting their glaſs.

Theſe ſorts of diamonds are differently fitted up; that uſed for large pieces, as looking-glaſſes, &c. is ſet in an iron ferril, about two inches long, and a quarter of an inch in diameter; the cavity of the ferril being filled up with lead, to keep the diamond firm: there is alſo a handle of box, or ebony, fitted to the ferril, for holding it by.

DIAMOND, in heraldry, a term uſed for expreſſing the black colour in the atchievements of peerage.

Guillim does not approve of blazoning the coats of peers by precious ſtones inſtead of metals and colours; but the engliſh practice allows it. Morgan ſays the diamond is the emblem of fortitude.

DIAMOND-CUTTER. See LAPIDARY.

DIAMORUM, in pharmacy, a preparation of mulberries and honey, uſed againſt diſeaſes of the throat, and for ſtopping dyſenteries, &c.

DIANÆ ARBOR, or **ARBOR LUNÆ**, in chemiſtry, the beautiful cryſtallizations of ſilver, diſſolved in aqua fortis, to which ſome quickſilver is added; and ſo called from their reſembling the trunk, branches, leaves, &c. of a tree.

This elegant arrangement, however, of the particles of ſilver is not peculiar to this ſtate or menſtruum, ſince copper filings dropped into the ſolution of ſilver in aqua fortis, is found to have the ſame effect, when viewed by the microſcope: nay, the ſilver-ores are frequently found ramified in the ſame manner.

DIANDRIA, in the linnæan ſyſtem of botany, a claſs of plants comprehending all thoſe with hermaphrodite flowers, and only two ſtamina in each; ſuch are ſage, olive, phillerea, jeſſamin, roſemary, &c.

DIANTHERA, in botany, a genus of the diandria-monogynia claſs of plants, whoſe corolla conſiſts of a ſingle ringent petal; the tube is patulous, of the length of the limb: the upper lip is of an ovated figure, the lower lip is divided into three oblong and equal ſegments.

DIANTHUS, in botany, a genus of the decandria-digynia claſs of plants, whoſe corolla conſiſts of five petals, the ungues of which are of the length of the cup; they are narrow, and inſerted into the receptacle; the limb is plane; and the bracteæ of the petals broadeſt at the extremity, and crenated; the fruit is a cylindric covered capſule, conſiſting of one cell, and opening four ways at the top; the ſeeds are numerous, compreſſed, and roundiſh. See plate LXXII. fig. 4. which repreſents the pink.

This genus comprehends the clove-jully-flowers or carnations, the pinks, and ſweet-williams; all beautiful flowers, which may be propagated by ſeeds or layers.

DIAPASMA, in pharmacy, a name for all powders ſprinkled on the body, whether as perfumes or otherwiſe. See the article CATAPLASM.

DIAPASON, in muſic, a muſical interval, by which moſt authors, who have wrote upon the theory of muſic, uſe to expreſs the octave of the Greeks. See OCTAVE.

The diapaſon is the firſt and moſt perfect of the concords; if conſidered ſimply, it is but one harmonical interval; though, if conſidered diatonically, by tones and ſemitones, it contains ſeven degrees, *viz.* the three greater tones, two leſſer tones, and two greater ſemitones.

The interval of a diapaſon, that is the proportion of its grave ſounds to its acute is duplicate, *i. e.* as 2 : 1. See the article INTERVAL.

DIAPASON, among the muſical inſtrument makers, a kind of rule or ſcale, whereby they adjuſt the pipes of their organs, and cut the holes in their flutes, hautboys, *&c.* in due proportion, for performing the tones, ſemitones, and concords juſt.

A ſquare being divided into eight parallelograms, the points wherein a diagonal line interſects all theſe parallelograms, expreſs all the uſual intervals in muſic: and on this principle it is that the diapaſon is founded. There is a particular kind of diapaſon for trumpets, ſerving as a ſtandard of the different magnitudes they muſt have to perform the four parts of muſic. See the article TRUMPET.

There is another for ſackbuts, ſhewing how far they are to be lengthened and ſhortened, to raiſe or fall from one tone to another.

The bell-founders have likewiſe a diapaſon, ſerving to regulate the ſize, thickneſs, weight, *&c.* of their bells.

DIAPASON DIAEX, in muſic, a kind of compound concord, whereof there are two ſorts; the greater, which is in the proportion of 10 : 3; and the leſſer, in that of 16 : 5.

DIAPASON DIAPENTE, in muſic, a compound conſonance in a triple ratio, as 3 : 9. This interval, ſays Martianus Capella, conſiſts of nine tones and a ſemitone; nineteen ſemitones, and thirty-eight dieſes. It is a ſymphony made when the voice proceeds from the firſt to the twelfth ſound.

DIAPASON DIATESSARON, in muſic, a compound concord, founded on the proportion of 8 : 3. To this interval Martianus Capella allows eight tones and a ſemitone, ſeventeen ſemitones, and thirty-four dieſes.

This is when the voice proceeds from its firſt to its eleventh ſound. The moderns would rather call it the eleventh.

DIAPASON DITONE, in muſic, a compound concord, whoſe terms are as 10 : 4, or 5 : 2.

DIAPASON SEMIDITONE, in muſic, a compound concord, whoſe terms are in the proportion of 12 : 5.

DIAPEDESIS, in medicine, a tranſudation of the fluids through the ſides of the veſſels that contain them, occaſioned by the blood's becoming too much attenuated, or the pores becoming too patent.

DIAPENSIA, in botany, a genus of the pentandria-monogynia claſs of plants, the flower of which conſiſts of one ſaucer-like petal, the tube being cylindrical, and the limb divided into five obtuſe, and plane ſegments; the fruit is a trilocular roundiſh capſule, containing a great many roundiſh ſeeds.

DIAPENTE, in the antient muſic, an interval marking the ſecond of the concords; and, with the diateſſaron, an octave. See the article DIATESSARON.

This is what in the modern muſic is called a fifth. See the article FIFTH.

The diapente is a ſimple concord; yet, if conſidered diatonically, it contains four terms; two greater tones, a leſs tone, and a greater ſemitone. The diapente is the greateſt part of the octave harmonically divided. It is produced when the voice paſſes from its firſt to its fifth ſound.

DIAPENTE COL DITANO, in muſic, is, by Zarlin, and many others, uſed for what we call the ſeventh major. See the article SEVENTH.

DIAPENTE COL SEMIDITANO, in muſic, is the ſeventh minor. See the articles MINOR and MAJOR.

DIAPENTE, in pharmacy, is uſed for a medicine compounded of five ſeveral drugs or ingredients.

DIAPERED, or DIAPRE', in heraldry, the dividing of a field in planes, like fretwork, and filling the ſame with variety of figures. This chiefly obtains on bordures, which are diapered or fretted over, and the frets charged with things proper for bordures. Baron renders it *variatus*, which is not ſufficient to expreſs the ſeveral things of which it is variated.

DIAPHANOUS, an appellation given to all tranſparent bodies, or ſuch as tranſmit the rays of light; a quality which, according to the carteſians, is owing to the rectitude or ſtraightneſs of their pores; but, according to Sir Iſaac Newton, to the homogeneity of the ſubſtance of theſe bodies, and of the medium which occupies their pores.

DIAPHOENICUM, in pharmacy, a ſort of medicine or electuary chiefly made of dates. It purges ſeroſities, and excites the menſes. It is alſo uſed in dropſies, lethargies, apoplexies, and palſies.

DIAPHORESIS, διαφορησις, in medicine, an elimination of the humours in any part of the body through the pores of the ſkin. See the article PERSPIRATION.

DIAPHORETICS, among phyſicians, all medicines which promote perſpiration. See the articles ALEXIPHARMIC and SUDORIFIC.

Internal medicines for producing ſweats were ſo little in uſe among the antients, that Celſus has not a ſingle word upon this ſubject. If, therefore, ſweats are of any advantage in fevers that ariſe from laſſitude, or ſome other ſimilar cauſe, ſuch as thoſe commonly called diary fevers, they ſeem to derive their efficacy from nature alone. But, from the times of the arabian phyſicians, there has appeared ſuch a multitude of ſudorific medicines, that there is ſcarce any ſpecies of fever, againſt which ſome of the chemiſts, or ſome curious old woman, has not found out an antidote, without having any manner of regard to the nature of the diſeaſe. Hence that cuſtom has been handed down, to our days, of treating feveriſh patients with cordials, as promiſing the moſt grateful and agreeable cure. This method, as conſiſting too much in hot medicines, is juſtly rejected by Sydenham, though it does not as yet ſeem to be ſufficiently baniſhed from modern practice; for, according to the confeſſion of phyſicians themſelves, theſe accelerate the motion of the blood: Hence the fever gradually increaſing and ſeizing the brain, we obſerve that the deliriums and diſtentions of the nerves are ſo far from being removed, that they are rather augmented. Others run into a different, though not a leſs fatal error, who, placing all their hopes of a cure in acids, forthwith have recourſe to vinegar or verjuice, as if it was expedient to kill a patient with cold, becauſe it was not proper he ſhould be parched with heat. See the article FEVER.

DIAPHRAGM, in anatomy, a large, robuſt, muſculous membrane or ſkin, placed tranſverſely in the trunk, and dividing the thorax from the abdomen, whence the latin writers call it ſeptum tranſverſum. Its ſituation is not exactly even, but ſomewhat oblique, ſo that the anterior part is higher, the poſterior lower; its upper ſuperficies convex, and its lower concave. It is connected with the ſternum, the ſpurious ribs, the pericardium, the mediaſtinum, and the vertebræ of the loins. Its figure, taken tranſverſely, is ſomewhat oblong and elliptic. There are in the diaphragm two large foramina; the firſt is in the left ſide of it, and gives paſſage to the gula, and the par vagum; the ſecond is in the right ſide of it, and the lower trunk of the vena cava paſſes thro' it: there is alſo an interſtice between the two heads of the lower part, through which paſs the aorta, the vena azygos, and the ductus thoracicus. The diaphragm is covered with a membrane on the upper part from the pleura; on the lower, from the peritonæum. Its ſubſtance is muſcular; the upper part, which is large and elliptic, ariſes from the ſpurious ribs, the tranſverſe muſcles of the abdomen, and the cartilago xiphoides; and, with its tendon, renders the nervous center of the diaphragm almoſt triangular: the lower ariſes from a double baſe, from the vertebræ of the loins on each ſide, and is inſerted nearly into the center of the ſuperior.

The uſes of the diaphragm are, firſt, to aſſiſt in reſpiration; for, in taking in the breath, it is preſſed downwards, and, in expiration, it riſes upward into the cavity of the thorax: ſecondly, to aſſiſt the neceſſary motions of the contents of the abdomen, *viz.* of the ſtomach, inteſtines, liver, and ſpleen; and in the promoting the ſecretions of the chyle, bile, *&c.* And, laſtly, for aſſiſting the expulſion of the fæces, the urine, the fœtus in parturition, and of the ſecundines.

DIAPORESIS, in rhetoric, a figure of oratory, expreſſing the uncertainty of the ſpeaker how he ſhall proceed in his diſcourſe: ſuch is that beautiful line of Homer,

Τι πρωτον, τι δ' επειτα, τι δ' ὑςατιον καταλέξω;

DIAPRE', DIAPERED, in heraldry. See the article DIAPERED.

DIAPRUNUM, in pharmacy, the name of two compoſitions directed thus in the London diſpenſatory.

The diaprunum lenitivum. Take of new and ripe damaſk prunes, one hundred; boil them in a ſufficient quantity of water, till they are ſoft: then remove them from the fire, and when cold, drive the pulp through a ſieve, and ſet by for uſe. In the liquor ſtrained from the prunes, before pulping, boil one ounce of violet flowers, and after ſtraining again, diſſolve it in two pounds of ſugar, and boil into a ſyrup; to which add of the beforementioned pulp half a pound; of caſſia and tamarinds, diſſolved in a little of the ſame decoction and pulped, of each one ounce; boil them again over a gentle heat, and frequently ſtir the mixture; after which ſift in the following powders, of coriander-ſeed, rhubarb, liquorice, and marſh-mallows roots, of each a ſufficient quantity to make into a ſoft electuary.

The diaprunum ſolutivum. Take of the lenitive compoſition of prunes, four pounds; of prepared ſcammony, two ounces five drams, and mix them together into an electuary.

DIARBEC, or DIARBECK, the capital of a province of the ſame name, anſwering to the antient Meſopotamia: it is ſituated on the river Tigris, near its ſource, in 42° eaſt long. and 37° 30′ north lat.

DIARRHODON, in pharmacy, a name given to divers compoſitions in which roſes are the principal ingredient. In the old college diſpenſatory, one of theſe is directed diarrhodon abbatis; but it is omitted in the laſt. There are alſo the trochiſci diarrhodon, compoſed of red roſes, ſhavings of ivory, the ſaunders, liquorice, maſtic, ſaffron, camphor, and roſewater: they are good to fortify the heart, ſtomach, and liver, and to ſtop dyſenteries, and other fluxes of the belly.

Pilulæ diarrhodon are compoſed of aloes, trochiſci diarrhodon, wormwood leaves, maſtic, and rock-ſalt. They are ſaid to purge, fortify the ſtomach, promote digeſtion, and prevent a ſtinking breath. Neither are theſe two much uſed at preſent.

DIARRHOEA, or LOOSENESS, in medicine, is a frequent and copious evacuation of liquid excrement, by ſtool; and may proceed from aliments or humours of various kinds, derived from different parts into the inteſtines.

The cauſe is a ſtimulus, which irritates the viſcera, occaſioning the expulſion of their fluids; and may, therefore, proceed from the veſſels of the liver, pancreas, meſentery, and inteſtines; whence at the ſame time, the mouths of the meſenteric veins, and of the lacteals, are obſtructed: or there may be an extraordinary laxity of the inteſtinal fibres: or, laſtly, it may ariſe from a ſtoppage of other excretions.

It is frequently attended with gripings; the patient is weak, makes but little urine, has a depreſſed pulſe, a depraved appetite, and is ſometimes feveriſh. In a diarrhœa ariſing from ſharp, fermenting juices in the primæ viæ, which accelerate the periſtaltic motion of the inteſtines, the firſt indication is to diſcharge the ſtimulating matter, which may be perfected by a doſe or two of rhubarb in the morning; at night the patient may take fifteen drops of the thebaic tincture, in two or three ſpoonfuls of ſimple cinnamon water: the rhubarb is to be repeated till the looſeneſs abates, which is generally after the ſecond doſe.

If there is a ſaburra of ill-concocted matter in the ſtomach, a vomit will be neceſſary, of ipecacuanha, or two ounces of its tincture. If the diarrhœa continues to be violent, it will be proper to mix aſtringents with the rhubarb. If it proceeds from a ſuppreſſed perſpiration, and if the ſtools are thin, and the patient feveriſh, firſt bleed, and then give emetics with a gentle purge. A bilious diarrhœa ought not to be too ſuddenly ſtopped, but the humours are to be corrected gradually: for which purpoſe a ſcruple of rhubarb ſlightly toaſted, with a few grains of nitre, is very uſeful. Likewiſe half a dram of the expreſſed oil of nutmeg, either alone, or mixed with a grain of opium, and given in broth, is very efficacious. The humours are likewiſe corrected with thin emulſions of almonds and white poppy ſeeds, with the addition of diacodium. When a diarrhœa is very obſtinate, after toaſted rhubarb has been given for ſome days, a ſweat ſhould be promoted, with a dram of new venice treacle, and twelve grains of burnt hartſhorn, calx of antimony and purified nitre. The patient's common drink may be decoct. alb. with ſolution of gum arabic; rice boiled in water, with a little cinnamon; or a decoction of the cort. granat. theſe may be made palatable with ſyrup of orange-peel. Clyſters are likewiſe often ſerviceable.

An obſtinate diarrhœa, according to Etmuller, is to be cured by a courſe of vomits of ipecacuanha. An habitual diarrhœa is greatly relieved by wearing a flannel ſhirt, and keeping the body warm, according to Wainwright.

The diarrhœa of children is not to be ſtopped, either with aſtringents, or narcotics: for the aſtringents turn the flux of ſharp humours towards the noble parts, and endanger the life of the child. And though narcotics appeaſe the ſeverity of the turgeſcent humours for a time, yet they afterwards break out with greater force. Beſides, opiates are too powerful for the tender conſtitution of infants, and muſt not be given at all, or with the utmoſt caution. In ſlight caſes, diaſcordium may be ventured on, to five or ſix grains: but if there is a fever, it cannot be given without danger.

Therefore, the beſt way is to give chalk, coral, pearls, and the like, of which about half a ſcruple is a doſe: after which the cure may be completed with rhubarb, from ſix grains to half a ſcruple in ſolutive ſyrup of roſes.

In dangerous caſes, a few grains of the eleuther bark may be added, or a dram of the extracts of peruvian bark may be diſſolved in half an ounce of mint, or cinnamon water, and given from one to nine drops, every three or four hours. Externally the abdomen may be anointed with expreſſed oil of nutmegs, impregnated with carminative and ſtomachic oils. The nurſe ſhould ſhun the cold air, abſtain from drinking too much, and uſe a temperate diet.

DIARTHROSIS, in anatomy, a kind of articulation, or juncture of the bones, in which there is a manifeſt motion. See the article ARTICULATION.

The diarthroſis comprehends, 1. The enarthroſis, in which the head of one of the bones is received into a deep cavity in the other, as in the articulation of the femur. 2. The arthrodia, in which the head of one of the bones is received into a ſlighter cavity in the other, as in the juncture of the os humeri with the ſcapula. 3. The ginglymus, in which the bones mutually receive, and are received by one another, as is the caſe in the articulation of the humerus and cubitus. To theſe, Fallopius adds the trochoides, in which the motion is like that of a wheel about its axis, as is the caſe of the articulation of the firſt vertebra of the neck with the ſecond: and to all theſe ſome of the modern anatomiſts have added alſo the amphiorthroſis, a term which comprehends all thoſe junctures of the bones which have a manifeſt motion, and which differ from the ſeveral articulations now deſcribed, either in regard of their figure, or the motion they allow of. See the articles ENARTHROSIS, ARTHRODIA, GINGLYMUS, *&c.*

DIARY, among traders, denotes a day-book containing the proceedings of one day. See the article BOOK.

DIARY FEVER, the ſame with an ephemera. See the article EPHEMERA.

DIASCHISM, διασχισμα, among muſicians, denotes the difference between the comma and enharmonic dieſis, commonly called the leſſer comma. See the articles COMMA and DIESIS.

DIASCORDIUM, in pharmacy, a celebrated compoſition ſo called from ſcordium, one of its ingredients. It is otherwiſe termed *confectio fracaſtorii*, and is thus directed by the college.

Take of cinnamon and caſſia-wood, of each half an ounce; of true ſcordium, one ounce; of cretan dittany, tormentil, biſtort, galbanum, and gum arabic, of each half an ounce; of ſtorax, four drams and an half; of opium, and ſeeds of ſorrel, of each one dram and an half; of gentian, half an ounce; of american bole, one ounce and an half; of lemnian ſealed earth, half an ounce; of long pepper and ginger, of each two drams; of clarified honey, two pounds and a half; of ſugar of roſes, one pound; of generous canary, eight ounces; make into an electuary. See the article ELECTUARY.

It is excellent in all kinds of fluxes, and a great ſtrengthener both of the ſtomach and bowels. Nurſes frequently give children this medicine to make them ſleep; but the practice is very detrimental, and generally the cauſe of many diſorders, as it keeps them too coſtive. It is alſo uſed againſt the plague, and to prevent putrefaction.

DIASEBESTEN, in pharmacy, a ſoft purgative electuary, whereof ſebeſtens are the principal ingredients. The other ingredients are prunes, tamarinds, juices of iris, anguria and mercurialis, penidies, ſimple diaprunum, violet ſeeds, and diagrydium. It is good in remitting and continued fevers, *&c.*

DIASENNA, in pharmacy, the name of a medicine in which ſenna is the principal ingredient.

The other ingredients are ſugar-candy, cinnamon, lapis lazuli, ſilk, cloves, galanga minor, black peper, nardus indica, ſeed of baſilicum, flowers of cloves, cardamoms, ſaffron, ginger, zedoary, *&c.* This electuary is taken againſt melancholy and ſpleen, and againſt diſeaſes ariſing from an atrabilis.

DIASIA, in grecian antiquity, a feſtival kept at Athens in honour of Jupiter the propitious.

DIASTASIS, a term uſed by antient phyſicians for a diſtention of the muſcles, or ſeparation of the bones.

DIASTEM, διαςημα, among antient muſicians, the ſame with what the moderns call interval. See INTERVAL.

Muſicians divide intervals into two kinds; one of them is called ſyſtem, which is to contain, at leaſt, two intervals in the diatonic kind of muſic; but in the enharmonic, it contains more: the other, which they call diaſtem, is a mere ſimple interval.

DIASTOLE, διαςολη, among phyſicians, ſignifies the dilatation of the heart, auricles, and arteries; and ſtands oppoſed to the ſyſtole, or contraction of the ſame parts. See SYSTOLE and HEART.

Many are the opinions of authors concerning the cauſe of the diaſtole of the heart; but the moſt probable one ſeems to be that of Dr. Drake, who attributes it to the operation of the air in the lungs; which, expanding the pulmonary arteries and veins, acts like the drawing of the embolus of a pump; and as this enlargement, which is very conſiderable, makes way for the blood to circulate, ſo the contraction of the heart acts like the preſſure of the atmoſphere upon the ſurface of water, compelling it to flow where the reſiſtance is leaſt. See CIRCULATION.

Thus a paſſage is opened for the blood to paſs from the right ventricle to the left, through the lungs; and at the ſame time, by emptying the right ventricle, facilitates the ſyſtole, whereby the blood is protruded from the left ventricle.

DIASTOLE, in grammar, a figure of proſody, whereby a ſyllable naturally ſhort is made long: ſuch is the firſt ſyllable of Priamides, in the following verſe of Virgil.

Atque hic Priamides: nihil ô tibi, amice,
relictum.

This figure is uſed either out of mere poetic licence, without any neceſſity for ſo doing, or through neceſſity, for the ſake of the verſe; as when three or more ſhort ſyllables follow each other in hexameter verſe.

DIASTYLE, in the antient architecture, an edifice, where the columns ſtand at ſuch a diſtance one from another, that eight modules, or four diameters, are allowed for the intercolumniation.

DIASYRMUS, διασυρμος, in rhetoric, a kind of hyperbole, being an exaggeration of ſome low, ridiculous thing.

DIATESSARON, διατεσσαρον, among antient muſicians, a concord, or harmonical interval, compoſed of a greater tone, a leſs tone, and one greater ſemi-tone: its proportion in numbers is as 4 : 3. See the article CONCORD.

DIATESSARON, in pharmacy, the name of a compoſition ſo called, from the four ingredients it comprehends: it is prepared thus.

Take of gentian root, bay-berries, myrrh, and roots of birthwort, of each two ounces; of honey, two pounds; mix them into an electuary. This, with the addition of the ſhavings of ivory, two ounces, is entitled diapente, or a compoſition of five ingredients.

This medicine was at firſt entered in the college diſpenſatories under the name of theriaca. Quincy recommends it as a medicine of great importance in the diſeaſes of cattle. It is alſo uſed againſt the ſting of venomous beaſts, epilepſies, convulſions, *&c.*

DIATONIC, an epithet given to muſic, as it proceeds by tones and ſemi-tones, both aſcending and deſcending. See the articles MUSIC and GENUS.

The greek authors divide the genera or kinds of muſic into diatonic, chromatic, and enharmonic. See the articles CHROMATIC and ENHARMONIC.

Diatonic muſic, according to Nicomachus and others, allows of three degrees, the greater tone, leſs tone, and ſemi-tone. See the article TONE.

Hence diatonic muſic appears the moſt natural, and of conſequence the moſt antient. In the diatonic muſic, there is a tone between every two notes in the ſcale, except *mi*, *fa*, and, as the French term it, *ſi* and *ut*, where there is only a greater ſemi-tone. The diatonic genus was by the antients divided into two ſpecies, the *molle* and the *intenſum*. The laſt is in daily practice. It is commonly ſaid to conſiſt of two tones and a ſemi-tone; but to ſpeak exactly, it conſiſts of a ſemi-tone major, a tone minor, and a tone major.

DIATONICO-DIATONICO, according to Zarlin, is the pure and natural diatonic genus, or when the progreſs of the notes is B quarré or B natural, in which not one of the ſounds is the leaſt altered. Such is the plain chant of the church.

DIATRAGACANTH, in pharmacy, a name applied to certain powders, whereof gum tragacanth is the principal ingredient; of which there are two kinds, the cold and the hot: the cold is directed thus: take of gum tragacanth, two ounces; of gum arabic, an ounce and two drams; of ſtarch, half an ounce; of liquorice, and the ſeeds of melons and white poppies, of each two drams; of ſugar-candy, three ounces: mix them into a powder. This is frequently preſcribed in hectical heats, in choleric conſtitutions, in diſtempers of the breaſt, in ſtranguries, heat of urine, and the pungency of venereal gleets.

Powder of hot diatragacanth is compoſed of gum tragacanth, cinnamon, hyſſop, almonds, linſeed, fenugreek, liquorice, and ginger. It is good againſt aſthmas, to promote expectoration, ſtrengthen the ſtomach, and aſſiſt digeſtion.

DIAUGOPHRAGMIA, in natural hiſtory, a genus of foſſils of the order of ſeptariæ, whoſe partitions, or ſepta, conſiſt of ſpar with an admixture of cryſtal. Of this genus, there are three ſpecies. 1. A red kind, with browniſh-yellow partitions. 2. A browniſh-yellow kind, with whitiſh partitions. 3. A bluiſh-white kind, with ſtraw-coloured partitions.

DIAULODROMI, διαυλοδρομοι, in antiquity, an appellation given to ſuch racers as paſſing round the meta, or goal, returned to the carcer, or place of ſtarting, before the race was finiſhed.

DIAZEUCTIC, or DIEZEUCTIC TONE, in the antient greek muſic, a tone which disjoined two fourths, one of each ſide of it; and which, being joined to either, made a fifth: this, in their muſic, was from *meſe* to *parmeſe*; that is, from our A to B: ſuppoſing *mi* to ſtand in B *ſub mi*, they allowed to their diezeuctic tone, which is our *la mi*, the proportion of 9 : 8, as being the unalterable difference of the diapente and the diateſſaron. See the article DIAPENTE, *&c.*

DIBBLE, among gardeners, the name of the tool, or forked ſtick, wherewith they ſet plants.

DICE, among gameſters, certain cubical pieces of bone or ivory, marked with dots on each of their faces, from one to ſix, according to the number of faces.

Sharpers have ſeveral ways of falſifying dice. 1. By ſticking a hog's briſtle in them, ſo as to make them run high or low, as they pleaſe. 2. By drilling and loading them with quickſilver; which cheat is found out by holding them gently by two diagonal corners; for if falſe, the heavy ſides will turn always down. 3. By filing and rounding them. But all theſe ways fall far ſhort of the art of the dice-makers; ſome of whom are ſo dextrous this way, that your ſharping gameſters will give any money for them.

Dice formerly paid 5 s. every pair imported, with an additional duty of 4s. $9\frac{45}{100}$ d. for every 20 s. value upon oath; but are now prohibited to be imported.

DICHOTOMY, a term uſed by aſtronomers for that phaſis, or appearance of the moon, wherein ſhe is biſſected, or ſhews juſt half her diſk. In this ſituation the moon is ſaid to be in a quadrate aſpect, or to be in her quadrature.

DICHOTOMY, in botany, a term uſed to expreſs that diviſion of the branches which we ſee in the miſletoe, and in the greater part of the ſea fucus's, in which each branch is divided into two.

DICKER, *dicra*, in old writers, denotes the quantity of ten hides of ſkins, whereof twenty made a laſt: alſo ten pair of gloves, ten bars of iron, and the like, are ſometimes expreſſed by the term dicker.

DICROTUS, among antient phyſicians, a rebounding pulſe, or one which beats double. See the article PULSE.

This is ſaid to be an infallible ſign of an approaching hæmorrhage; which may be expected in twenty-four hours, if the dicrotus happens at every ſecond or third pulſation; in two days, if at every eight; in three days, if at every ſixteenth; and in four days, if only at every thirtieth, or thirty-ſecond pulſation.

DICTAMNUS, DITTANY, in botany, a genus of the decandria-monogynia claſs of plants, the corolla of which conſiſts of five ovato-lanceolated, accuminated, unguiculated, and unequal petals; three of which are turned upwards, and two are placed obliquely at the ſides: the fruit is compoſed of five capſules, growing together by their inſides; they are compreſſed, accuminated, diſtant at the top, and formed of two valves: the ſeeds are numerous, and turbinated. See plate LXXII. fig. 5.

The antients have recorded almoſt miracles of the virtues of this plant in the cure of wounds, and in the prevention of miſchief from venomous bites: they tell us, that even the beaſts were informed of its virtues on theſe occaſions, and had recourſe to it when hurt: they gave it alſo to promote the menſes, and to aſſiſt delivery, in the expelling of the ſecundines, and in malignant fevers: with us it is wholly out of uſe, except as an ingredient in ſome of the officinal compoſitions.

The white dittany-root, which we call fraxinella in the ſhops, is accounted cardiac, uterine, and alexipharmic.

DICTATE, *dictamen*, among ſchoolmen, a motion, or ſuggeſtion of a man's conſcience, contrary to which if any action is performed, it is properly termed a bad one, even if the conſequences ſhould prove otherwiſe. See CONSCIENCE.

DICTATE, *dictata*, is alſo uſed in the ſchools for the lecture of a maſter, which the ſcholars take down in writing: whence this act of the maſter is termed dictating.

DICTATOR, in the policy of the antient Romans, a magiſtrate inveſted with ſovereign and even arbitrary power.

He had power of life and death; alſo to raiſe or diſband troops, make war or peace, and that without the conſent either of the ſenate or people, or being accountable for his proceedings. He was elected by one of the conſuls in the night-time on the frontiers of the common-wealth, and no where elſe; and the ordinary duration of his office was only for ſix months, during which time all other magiſtracies ceaſed, the tribuneſhip excepted. Whenever he appeared in public, he was attended by twenty-four lictors, or double the number allowed a conſul. However, notwithſtanding all this power, he could not go out of Italy, or even ride on horſeback during a march, without leave from the people.

This office was accounted the ſafeguard of the commonwealth for four hundred years together, till Sylla and Cæſar, by aſſuming the title of perpetual dictators, converted it into tyranny, and rendered the very name odious.

DICTION, the phraſe, elocution, or ſtile of a writer, or ſpeaker.

It is required that the diction, or language, of an orator, ſhould be pure, proper to the ſubject, rich without affectation, ſtrong and cloſe without drineſs, and ſuitable to the perſon, time, place, and audience. In tragedy, the diction is accounted the fourth eſſential part; and though it is of the leaſt importance of any of the other eſſentials, yet ſpecial care muſt be taken that every paſſion ſpeak in its peculiar diction. It is obſerved, that the diction of the Italians abounds too much with ſhrewd words, querks, and quibbles; and even the French are charged with the like fault in their diction. Some authors are, again, thought ſo prepoſterouſly fond of jocoſe and facetious repartees, and ludicrous ſentences, that they have indulged this affectation to a fault; whence aroſe that ſort of diction commonly called burleſque, of which the French have afforded us a ſpecimen in the works of the celebrated Scarron.

DICTIONARY, a collection, or catalogue, of all the words of a language, art, ſcience, *&c.* with their explanations, ranged in alphabetical order.

The moſt antient dictionaries for the latin tongue, are that called Papias, compiled by Solomon, abbot of St. Gall, and biſhop of Conſtance, who lived about the year 1409; another compiled in 1496, called Gemma Vocabulorum; a third, called Promptorium Parvulorum, ſive Clericorum, printed in folio, at London, in the year 1499, by Richard Pynſon: this work conſiſted only of one part, which exhibited the engliſh words before the latin, being deſtitute both of the latin and hiſtorical parts: but theſe defects were ſupplied by a dictionary which was printed at London in quarto in the year 1516, by Wynkyn de Worde, entitled, Ortus Vocabulorum alphabetico ordine fere omnia quæ in Catholico, Breviloquio, Cornucopia, Gemma Vocabulorum, atque medulla grammaticæ ponuntur, cum vernaculæ linguæ Anglicanæ expoſitione, continens. The moſt celebrated old latin dictionary, is that of Ambroſe Calepine, a hermit of St. Auguſtine, at Bergamo, and ſon of the count Calepin. The moſt noted old dictionaries in engliſh and latin are thoſe of Cooper, Holyoake, and Gouldman: among the modern ones, Littleton, Cole, *&c.* but that of Ainſworth merits moſt conſideration, as being agreeable to its title, Theſaurus linguæ Latinæ compendiarius. The laſt editions of this book have been greatly improved by Samuel Patrick, L. L. D.

For the Greek, the moſt noted dictionaries are thoſe of Stephens, Scapula, Schrivelius, Hedericus, *&c.* For the Engliſh there are ſeveral dictionaries, but that of the moſt authority is Johnſon's. The moſt celebrated hiſtorical dictionary is that of Mr. Bayle, in two volumes folio, entitled, an hiſtorical and critical dictionary. The philoſophical dictionary of greateſt note, is that of Chauvinus; for commerce, that of Savary; for law, thoſe of Calvinus and Jacob; and among the dictionaries of arts and ſciences, may be reckoned thoſe of Harris and Chambers.

In the French, the moſt worthy of notice among works of this nature are the dictionary of Trevoux, and the Encyclopedie.

A performance of this kind being a digeſt of the body of learning, or, rather, of general knowledge, is thought capable of being made univerſally uſeful and inſtructive; and as the objects of our knowledge grow daily more numerous, and improvements in arts and ſciences are continually made, a work of this kind is continually capable of new improvements. It is farther advanced, that, beſides preventing, in ſome meaſure, the neceſſity and expence of a multitude of books, which too frequently retard rather than promote, and bewilder rather than guide in the purſuit of knowledge, there is no form or method of writing ſo advantageouſly diſpoſed to propagate knowledge through the body of a people, or that can be made to comprehend ſo great a part of the circle of learning, and ſo well anſwer the purpoſes of a library, as a dictionary of this nature. The writers of a dictionary of arts and ſciences, are exempted from the obſervation of certain laws concerning property; never pretending to build upon their own foundation, or treat at their own expence, being privileged to raiſe contributions for the public ſervice wherever they can. In effect, their quality as dictionariſts, or collectors, give them a title to every thing that may ſuit their purpoſe, without rendering them liable to the imputation of plagiariſm. See more relating to the nature, character, and office of a dictionary, in the *introduction*.

DICTUM, in our old writers, ſignifies an arbitrament or award; and hence the term dictores is uſed for arbitrators.

DICTUM DE KENELWORTH, was an award between king Henry III. and his barons and others who had been in arms againſt him, wherein was contained a compoſition of thoſe that had forfeited their eſtates in the rebellion. It was ſo called, on account of its being made at Kenelworth caſtle in Warwickſhire.

DIDACTIC, or **DIDACTICAL**, in the ſchools, ſignifies the manner of ſpeaking, or writing, adapted to teach or explain the nature of things.

DIDAPPER, in ornithology, the ſame with the dob-chick, a ſpecies of colymbus.

DIDELPHIS, in zoology, a genus of quadrupeds, of the order of the glires, the characters of which are theſe: there are two obtuſe and four conical fore-teeth, in the upper jaw; thoſe of the lower jaw are eight, and very ſmall; and the dog-teeth, in each jaw, are three in number. To this genus belong the opoſſum, and african rat.

DIDYNAMIA, διδυναμια, in the linnæan ſyſtem of botany, a very comprehenſive claſs of plants, the fourteenth in order; the eſſential characteriſtic of which is, that there are four ſubulated ſtamina, inſerted into the tube of the flower, two whereof are ſhorter than the others, and placed together; the antheræ being commonly hid under the upper lip of the flower, and connivent in pairs. It has its name from the two longer ſtamina being ſuppoſed more efficacious in fecundating the ſeeds, than the reſt; and as the genera belonging to it are very numerous, they have been divided into two ſeries or orders, under the names of gymnoſpermia and angioſpermia; the latter having, and the former wanting a pericarpium, or ſeed-veſſel. See the article BOTANY.

To this genus belong baum, germander, lavender, thyme, betony, mint, baſil, fox-glove, bear's-breech, *&c.*

DIE, in architecture, the ſame with dye. See the article DYE.

DIE, in geography, a town of France, in the province of Dauphiny, ſituated on the river Drome, twenty-two miles ſouth of Grenoble: eaſt long. 5° 20′, north lat. 44° 50′.

DIEGEM, a town of the auſtrian Netherlands, in the province of Brabant, about three miles north of Bruſſels: eaſt long. 4° 20′, and north lat. 51°.

DIEM CLAUSET EXTREMUM, a writ that formerly iſſued out of the chancery to the eſcheator of the county, upon the death of any of the king's tenants in capite, to inquire by a jury of what lands he died ſeiſed, of what value, and who was the next heir to him: and on the heir's coming of age, he was to ſue livery of his land out of the king's hands.

DIEPE, a port-town of France, ſituated on the britiſh channel, about thirty miles north of Rouen, and oppoſite to the port of Rye in England: eaſt long. 1° 15′, and north lat. 49° 55′.

DIEPHOLT, a city of Weſtphalia, in Germany, ſituated at the north end of the Dummer-lake, thirty-five miles ſouth of Bremen: eaſt long. 8°, north lat. 53°. It is ſubject to the king of Great Britain, as elector of Hanover.

DIER, or **DYER**. See the article DYER.

DIERVILLA, in botany, a genus of the pentandria-monogynia claſs of plants; the flower of which is monopetalous, with an almoſt bilabiated limb, whereof the upper lip is again divided into two, and the under one into three ſegments: the fruit is an oval capſule ſurrounded by the cup, with only one cell, wherein are contained a great many very ſmall oval ſeeds.

DIES, DAY, in chronology. See DAY.

DIES, in common law, are of two kinds, dies juridici, and non juridici.

DIES JURIDICI, or FASTI, are all days wherein juſtice is adminiſtred in court.

DIES NON JURIDICI, or NEFASTI, are all Sundays in the year, and, in eaſter term, the feaſt of aſcenſion of our Lord; in trinity term, the nativity of St. John the baptiſt; in michaelmas term, the feaſt of all ſaints and all ſouls; and in hilary term, the purification of the bleſſed virgin.

DIES DATUS, is a day, or time of reſpite, given by the court to the defendant in a cauſe.

DIES MARCHIÆ, was the day of congreſs, or meeting of the Engliſh and Scotch, annually appointed to be held on the marches, or borders, in order to adjuſt all differences between them.

DIESIS, in muſic, is the diviſion of a tone leſs than a ſemi-tone; or, an interval conſiſting of a leſs or imperfect ſemi-tone.

Dieſis is the ſmalleſt and ſofteſt change or inflexion of the voice imaginable; it is called a feint, expreſſed thus X, by a St. Andrew's croſs, or ſaltier. Ariſtotle calls dieſes the elements of the voice, as letters are thoſe of diſcourſe. It appears, however, that Ariſtotle's dieſes were different from ours; and we find Vitruvius, and all the greek authors, expreſsly make the dieſis a quarter of a tone: but the Pythagoreans, who are held inventors of the name dieſis, did not make it ſo ſmall: they only divided the tone into two unequal parts; and they called the leſſer dieſis, which we call a leſſer ſemi-tone; and the greater, which we call the greater ſemi-tone, they called apotome. See the article APOTOME.

But in aftertimes, when the tone came to be divided into three or four parts, the name dieſis was retained to them all.

The harmonical dieſis is the difference between a greater and a leſs ſemi-tone. Dieſes are divided into three kinds; the leſſer enharmonical dieſis, or ſimple dieſis, marked by a ſingle croſs, which raiſes the note following two commas, or about a quarter of a tone, and is the leaſt interval that is ſung; and never more than two are found together in whatever genus; nor are thoſe two of the ſame kind. The chromatic or double dieſis, denoted by a double croſs, raiſes the note following by a leſſer ſemi-tone, or four commas, which is the common dieſis. The greater enharmonical dieſis, denoted by a triple croſs, raiſes the following note ſix or ſeven commas, or about three quarters of a tone.

DIEST, a town of the auſtrian Netherlands, in the province of Brabant, ſituated on the river Demer, fifteen miles north-eaſt of Louvain: eaſt long. 5°, and north lat. 51° 5′.

DIET, *diæta*, διαιτα, in medicine, according to ſome, comprehends the whole regimen, or rule of life, with regard to the ſix non-naturals, air, meats and drinks, ſleep and watching, motion and reſt, paſſions of the mind, retentions and excretions. See the article REGIMEN, *&c.*

The more accurate writers, however, reſtrain the term diet to what regards eating and drinking, or ſolid aliments and drinks. See FOOD and DRINK.

The principal and moſt general aliment is bread, whereof the cruſt is eſteemed moſt eaſy of digeſtion, the crum being more oily and heavy. Pulſe of all kinds nouriſh much, but are heavy, windy, and viſcous, and, conſequently, are apt to cauſe obſtructions. Rice, barley, and oats, properly prepared, are nouriſhing, emollient, and reſtorative. Nuts, almonds, and cheſnuts are full of a nouriſhing oil, but are hard of digeſtion. Fruits, which are pulpy and tart, abound with water, and are refreſhing, moiſtening, and ſedative, appeaſing the too rapid motions of the blood, quenching thirſt, and digeſting eaſily: ſuch are ſtrawberries, gooſeberries, currants, apricots, peaches, pears, and apples. Theſe ſhould be eaten ripe, and in a ſmall quantity at once; and the beſt way of all is to eat them boiled or baked, as being windy. Pot-herbs are leſs nouriſhing than the farinaceous or mealy ſubſtances. Lettuce, ſuccory, ſorrel, purſlain, are cooling and refreſhing; artichoaks, cellery, creſſes, aſparagus, and parſley, are a little heating; and truffles, champignons, garlic, ſhallots, pepper, cloves, nutmegs, muſtard, *&c.* heat very much.

Of animal ſubſtances uſed in diet, the fleſh of young animals is preferred to that of old ones: and the fleſh of wild animals is ſaid to be lighter, and more eaſily digeſted, than that of tame.

Liquid aliments are milk, eggs, chocolate, ſoups, and broths. Milk is good for weak perſons, whoſe ſtomach is languid, and for children; new laid eggs yield very good nouriſhment, are eaſy of digeſtion, and agree with old people, and thoſe of an exhauſted body. Chocolate is a very agreeable and nouriſhing liquor: it ſtrengthens the ſtomach, reſtores the body, helps the digeſtion, and ſoftens ſharp humours; and conſequently is very proper for perſons of a weak ſtomach. See EGG, CHOCOLATE, *&c.*

As to drinks, wine, taken too freely, is prejudicial; but, taken with moderation, it ſtrengthens the ſtomach, and aſſiſts digeſtion. That malt liquor is accounted beſt, which is ſpecifically lighteſt, and not ſaturated with too groſs a ſubſtance, as paſſing more freely through the emunctories of the body, and eſpecially by urine: for as to all thick, muddy, heavy, and ſtale-beer, not ſufficiently boiled, it offends the head, generates wind, obſtructions, the ſtrangury, aſthma, and colic. See WINE, BEER, CYDER, *&c.*

Tea promotes perſpiration, ſtrengthens and clears the ſtomach, and helps digeſtion. Coffee, taken after dinner, helps digeſtion, and allays the fumes of wine. Moderately taken, it thins the blood and humours; but its exceſs agitates the blood, cauſes watching, and occaſions hæmorrhages.

From this view of the materials of diet, it appears, that the beſt way to preſerve health, is to live upon plain ſimple foods, lightly ſeaſoned, and in a quantity agreeable to the age, ſtrength of the ſtomach, ſex, conſtitution, and chiefly to what nature has by experience been found to require. Hunger ſhews the beſt time of eating, as thirſt does of drinking. Perſons who find no inconvenience from dining and ſupping every day, need not change their manner of life; and, in youth, ſomething taken between meals is not amiſs. When a perſon is much fatigued, and his ſpirits diſſipated, it is proper to reſt before eating; and, in caſes of diſtreſs and ſorrow, the food ſhould be very light, and ſmall in quantity. In ſummer, when the ſpirits and fluid parts are apt to evaporate, the diet ſhould be moiſt, cooling, and eaſy of digeſtion, to repair the loſs with the greater ſpeed; whereas, in winter, the ſtomach will admit of more ſolid and heating aliments. See the articles FLESH, FRUIT, BUTTER, MILK, *&c.*

DIET-DRINKS, a form in phyſic, including all the medicated wines, ales, and wheys, uſed in chronic caſes. They require a courſe or continuation to anſwer any intention of moment. In all acute caſes they are of no uſe, but where the diſorder of a conſtitution is gradually to be gained upon, much help may be had from this quarter.

DIET, or **DYET**, in matters of policy, is uſed for the general aſſembly of the ſtates, or circles of the empire of Germany, and of Poland, to deliberate and concert meaſures proper to be taken for the good of the public.

The general diet of the empire is uſually held at Ratiſbon: it conſiſts of the emperor, the nine electors, and the eccleſiaſtical princes; *viz.* the archbiſhops, biſhops, abbots, and abbeſſes; the ſecular princes, who are dukes, marqueſſes, counts, viſcounts, or barons; and the repreſentatives of the imperial cities. It meets on the emperor's ſummons, and any of the princes may ſend their deputies thither in their ſtead. The diet makes laws, raiſes taxes, determines differences between the ſeveral princes and ſtates, and can relieve the ſubjects from the oppreſſions of their ſovereigns.

The diet of Poland, or the aſſembly of the ſtates, conſiſts of the ſenate and deputies, or repreſentatives of every palatinate or county and city, and meet uſually every two years, and oftener, upon extraordinary occaſions, if ſummoned by the king, or, in his abſence, by the archbiſhop of Gneſna. The general diet of Poland ſits but ſix weeks, and often breaks up in a tumult much ſooner: for one diſſenting voice prevents their paſſing any laws, or coming to any reſolutions on what is propoſed to them from the throne. Switzerland has alſo a general diet, which is uſually held every year at Baden, and repreſents the whole helvetic body: it ſeldom laſts longer than a month. Beſides this general diet, there are diets of the proteſtant cantons, and diets of the catholic ones; the firſt aſſemble at Araw, and are convoked by the canton of Zurich; the ſecond at Lucern, convoked by the canton of that name.

DIETS, a town in the circle of the upper Rhine, in Germany, ſituated on the river Lohn, twenty miles north of Mentz, and ſubject to the houſe of Naſſau-Orange: eaſt long. 7° 40′, and north lat. 50° 28′.

DIEU ET MON DROIT, i. e. *God and my right*, the motto of the royal arms of

England, firſt aſſumed by king Richard I. to intimate that he did not hold his empire in vaſſalage of any mortal.

It was afterwards taken up by Edward the third, and was continued without interruption to the time of the late king William, who uſed the motto *je maintiendray*, though the former was ſtill retained upon the great ſeal. After him queen Anne uſed the motto *ſemper eadem*, which had been before uſed by queen Elizabeth; but ever ſince queen Anne, *dieu et mon droit* continues to be the royal motto. See the article MOTTO.

DIEU SON ACT, words antiently often uſed in our law; and to this day, it is a maxim in law, that the act of God ſhall prejudice no man: therefore, if a houſe is blown or beaten down by a tempeſt, thunder or lightning, the leſſee, or tenant for life, or years, ſhall be quit of an action of waſte; and by the law he has likewiſe a ſpecial intereſt or liberty allowed to take timber, to rebuild the houſe for his habitation.

DIEXAHEDRIA, in natural hiſtory, a genus of pellucid and cryſtalliform ſpars, compoſed of two pyramids, joined baſe to baſe, without any intermediate column: the diexahedria are dodecahedral, or compoſed of two hexangular pyramids. See the article SPAR.

DIFFAMATORY, a term chiefly uſed in the phraſe diffamatory libel, ſignifying a writing intended to ſcandalize or diſcredit a perſon, &c.

By the roman law, and the antient ordonnances of France, the authors of diffamatory libels were puniſhed with death.

DIFFARREATION, in roman antiquity, a ceremony whereby the divorce of the prieſts was ſolemnized, or the diſſolving of marriage contracted by confarreation. See the article CONFARREATION.

Vigenere will have confarreation and diffarreation to be the ſame thing.

DIFFERENCE, in logic, ſignifies an eſſential attribute belonging to any ſpecies that is not found in the genus, and is the univerſal idea of that ſpecies: thus, body and ſpirit are two ſpecies of ſubſtance, which contain in their ideas ſomething more than is in that of ſubſtance. In a body, we find impenetrability and extenſion; in a ſpirit, a power of thinking and reaſoning; ſo that the difference of body is impenetrable extenſion, and the difference of a ſpirit is cogitation.

DIFFERENCE, in mathematics, is the remainder, when one number or quantity is ſubtracted from another.

It was a fundamental principle among the antient geometers, that the difference of any two unequal quantities, by which the greater exceeds the leſſer, may be added to itſelf till it ſhall exceed any propoſed finite quantity of the ſame kind. This principle ſeems inconſiſtent with the ſuppoſition of an infinitely ſmall quantity, or difference, which added to itſelf by any number of times, is never to be ſuppoſed to become equal to any finite quantity whatſoever, which is the foundation of the modern method of infiniteſimals: however, this laſt may, with proper caution, be made uſeful and accurate.

DIFFERENCE *of longitude*, of two places on the earth, is an arch of the equator, comprehended between the meridians of theſe two places.

DIFFERENCE *of aſcenſion*. See the article ASCENSIONAL DIFFERENCE.

DIFFERENCES, in heraldry, certain additaments to coat armour, whereby ſomething is added or altered to diſtinguiſh younger families from the elder.

Of theſe differences Sylvanus Morgan gives us nine, *viz.* the label, for the firſt ſon; the creſcent, for the ſecond; the mullet, for the third; the martlet, for the fourth; the annulet, for the fifth; the flower de lis, for the ſixth; the roſe, for the ſeventh; the eight-foil, for the eighth; and the croſs moline, for the ninth. See LABEL, CRESCENT, &c.

Again, as the firſt differences are ſingle for the ſons of the firſt houſe or deſcent, the ſons of the younger houſe are differed by combining or putting the ſaid differences upon each other. As the firſt differences are the label, creſcent, &c. for the firſt houſe, the difference for the ſecond houſe is the label on a creſcent for the firſt of that houſe; for the third brother of the ſecond houſe, a mullet on a creſcent, &c.

The original difference is controverted: Camden will have them to have begun about the time of king Richard: Paradin aſſigns differences worn as early as the year 870; wherein he contradicts the opinion of the preſident Fauchet, who ſays, arms were not hereditary in the french families, till after the time of Lewis the Gros, who came to the crown in the year 1110.

DIFFERENTIAL CALCULUS. See the article CALCULUS DIFFERENTIALIS.

DIFFERRENTIAL, *differentialis*, in the doctrine of logarithms, a term uſed by Kepler for the logarithms of tangents, which we call artificial tangents. See the articles LOGARITHM and TANGENT.

DIFFERENTIO-DIFFERENTIALIS CALCULUS, is a method of differencing differential quantities.

We have obſerved, under the word calculus, that the differential of a quantity is expreſſed by the letter *d* prefixed to it, as the differential of x is called $d\,x$; we are to remark, therefore, in this place, that the differential of $d\,x$, is $d\,d\,x$; and the differential of $d\,d\,x$, is $d\,d\,d\,x$; or, as Sir Iſaac Newton would expreſs it, $\dddot{x}$, &c. Theſe differentials may be expreſſed more compendiouſly thus, $d^2\,x$, $d^3\,x$, &c. whence we have powers or degrees of differentials. The differential of an ordinary quantity, is called a differential of the firſt degree, as $d\,x$. The differential of the ſecond degree, is an infiniteſimal of a differential quantity of the firſt degree, as $d\,d\,x$, $d\,x\,d\,x$, or $d\,x^2$, $d\,x\,dy$, &c. The differential of the third degree, is an infiniteſimal of a differential quantity of the ſecond degree, as $d\,d\,d\,x$, $d\,x^3$ $d\,x\,d\,y\,d\,z$, and ſo on.

The powers of differentials are differenced after the ſame manner as the powers of ordinary quantities: and as compound differentials either multiply or divide each other, or are perfect or imperfect powers of differentials of the firſt degree, the differentio-differentialis calculus is in effect the ſame with the differential calculus. See the article CALCULUS DIFFERENTIALIS.

For the uſe of the differentio-differentialis calculus, ſee Wolfii Elementa Analyſeos, par. 2. ſect. iv.

DIFFORM, *difformis*, an appellation given to things whoſe appearance is irregular, in contradiſtinction to uniform. See the article UNIFORM.

It is much uſed in the deſcription of plants of the ſyngeneſia claſs, or thoſe with compound flowers, when the partial flowers, or ſmaller floſcules, happen to be of different kinds. See the article FLOWER.

DIFFUSE, an epithet applied to ſuch writings as are wrote in a prolix manner. Among hiſtorians, Salluſt is reckoned ſententious, and Livy diffuſe. Thus alſo among the orators, Demoſthenes is cloſe and conciſe; Cicero, on the other hand, is diffuſe.

DIFFUSION, the diſperſion of the ſubtile effluvia of bodies into a kind of atmoſphere all round them. Thus the light diffuſed by the rays of the ſun, iſſues all round from that amazing body of fire; and thus are the magnetic particles diffuſed every where round about our earth, and parts adjacent to it.

The ſchoolmen make three kinds of diffuſion. 1. That by which a pure quality is diffuſed, as light, force, &c. 2. That performed by the motion of bodies, as the diffuſion of ſound, ſmell, magnetic and electric bodies, &c. And, 3. That performed partly by the motion of corpuſcles, and partly by the motion of a quality. Thus, ſay they, fire is diffuſed.

DIGASTRICUS, in anatomy, a muſcle of the lower jaw, called alſo biventer. See the article BIVENTER.

Mr. Monro aſſures us, that the digaſtric muſcles not only pull down the lower jaw, but ſerve to draw up the os hyoides, and parts annexed to it, in deglutition. See the Medical Eſſays, vol. I. art. 11.

DIGEST, *digeſtum*, in matters of literature, a collection of the deciſions of the roman lawyers properly digeſted, or arranged under diſtinct heads, by order of the emperor Juſtinian. It conſtitutes the firſt part or volume of the civil law.

DIGESTER, or DIGESTOR. See the article DIGESTOR.

DIGESTION, in medicine, is the diſſolution of the aliments into ſuch minute parts as are fit to enter the lacteal veſſels, and circulate with the maſs of blood.

Various are the ſyſtems and hypotheſes framed by phyſicians and philoſophers to account for digeſtion. Some contend that it is done by a kind of elixation of the ſolid and groſſer parts of the food in the liquid by the heat of the ſtomach, and of the adjacent parts, the liver, ſpleen, &c. Others will have it done by attrition, as if the ſtomach, by thoſe repeated motions, which are the effects of reſpiration, rubbed off the minuter particles from the groſſer matters, and agitating the reſt againſt each other, attenuated and diſſolved them. See TRITURATION. Others think the bilious juice, others the ſpirits chiefly concerned in digeſtion.

Others will have the food diſſolved by a menſtruum; but then they are greatly divided as to the nature and origin of this menſtruum; ſome ſuppoſing it an acid furniſhed by the glands of the ſtomach; others, a nitro-aerial ſpirit, which by penetrating the maſs of food, breaks the connection of the moſt ſolid parts: and others, a ſaline juice, which divides and volatilizes the parts of the food. Others, again, ſuppoſe digeſtion to be performed by means of a ferment or leaven, which mixing with the aliment, excites an inteſtine motion in the parts thereof, by which means the parts are attenuated and diſſolved. But theſe likewiſe differ in their opinion of this ferment: ſome taking it to be the remains of the food laſt digeſted, which, by its continuance in the ſtomach, has contracted an acid quality and become a ferment: others take the principles of fermentation to be contained in the aliment itſelf, which when incloſed in the ſtomach, heated there, and put in motion, enters on its office of fermentation: others ſuppoſe the matter of the ferment ſupplied by the glands of the ſtomach; and laſtly, others contend for the ſaliva, and make that the ferment ſerving principally for the digeſtion of the food. See the article FERMENTATION.

Some ſuppoſe digeſtion owing to gentle heat and motion. By this heat and motion, ſay they, the texture of the nouriſhment is changed in the bodies of animals; and then the conſtituent ſolid parts are indued with peculiar attractive powers of certain magnitudes, by which they draw, out of the fluids moving through them, like parts in certain quantities, and thereby preſerve their forms and juſt magnitudes. And, to mention no more, Boerhaave very juſtly, in our opinion, aſcribes digeſtion to the joint action of ſeveral of the above-mentioned cauſes, aided by the expanſion of the air contained in the aliments. See the articles CHYLE, CHYLIFICATION, BLOOD, &c. MASTICATION, NUTRITION, &c.

Want of DIGESTION, a diſeaſe attended with pain, and a ſenſe of weight with eructations and copious flatulencies from corrupt humours in the ſtomach. See APEPSY.

It generally ariſes from a bad diet, particularly from eating too plentifully, eſpecially fat and oily aliments, with a ſedentary life and idleneſs. When the humours are corrupt, after a vomit, laxatives ſhould be uſed: afterwards with a ſpare diet, ſtomachics and ſtrengthners, with exerciſe, and abſtinence from ſtudies. The uſe of ſpaw, or chalybeate waters is very efficacious for the cure of this diſeaſe. In almoſt all weakneſſes of the ſtomach, chewing of rhubarb is convenient, eſpecially in thoſe that are coſtive.

DIGESTION, in chemiſtry, pharmacy, &c. the ſubjecting bodies, included in proper veſſels, to the action of a gentle and continued heat.

The application of this operation, in regard to its end, is very various. In ſome caſes, it is uſed with a view of producing a change in ſome one ſingle body, as in the inſtance of the preparation called mercurius præcip. per ſe; in others, to promote ſolutions, or other combinations; but moſt frequently for extraction or ſeparation, by means of fluids, of the required parts of ſome ſolid bodies, whoſe texture, impeding the quicker acceſs and effect of menſtrua, renders a long infuſion, and the relaxation of a gentle heat, neceſſary, in order to their being penetrated; or for accelerating the ſolution of bodies by menſtrua, whoſe action when cold is not ſufficiently vigorous.

The veſſels generally uſed to contain the matter to be digeſted, are mattraſſes, or bolt-heads, and ſometimes glaſſes; but where the heat is ſo gentle as to make no evaporation, the ſtructure is indifferent. In caſes where an evaporation does happen, and the exhaling fluid is of any value, the veſſels are to be conſtructed ſo as to confine the vapour, and return it in a condenſed ſtate. This is called circulation, and is commonly executed by inverting the neck of a ſmaller matraſs into that of a larger, in which caſe the conjoined glaſſes are called a pelican. There are ſeveral other kinds of pelicans of a more complex ſtructure, but the flaſk uſed for Florence wine, diveſted of the ſtraw work, and inverted into a matraſs, with a very long neck, will conveniently anſwer all the purpoſes. See CIRCULATION.

This operation is moſt generally performed in a ſand-heat, and no greater adjuſtment of the degrees of heat is neceſſary for the purpoſes of pharmacy, than can be there effected; but formerly when the more myſterious and operoſe methods were followed, the heat of dunghills has been employed.

The degree of heat requiſite in digeſtion, differs according to the nature of the ſubject: in tinctures, made with ſtrong ſpirit of wine, or volatile ſalts, and in ſolutions where a great efferveſcence is apt to ariſe, a very gentle one ſhould never be exceeded. In aqueous ſolution, and moſt other caſes, a greater may be allowed; but it muſt always be underſtood to be leſs than will make the matter boil, otherwiſe the operation comes not within the proper meaning of the word digeſtion, which is a diſtinction from coction.

The time which digeſtion ought to be

continued, differs ſo greatly, according to the different application of the operation, that no other rule for it can be laid down, than that it ſhould be continued till the intention to which it is made ſubſervient be compleated.

In circulatory digeſtions it is proper to lute the veſſels, to prevent the eſcape of the vapours through the junctures, but in many caſes this following precaution is extremely neceſſary, *viz.* that a ſmall aperture, or vent, be left, otherwiſe an incondenſible vapour, which ariſes, will, if it cannot force the lute, inevitably burſt the glaſſes. The inſtances in which this precaution is neceſſary, are all mixtures of acid ſpirits, with earths, metals, or alcaline ſalts; or of ſuch ſalts of thoſe ſubſtances which can be acted on by them. But in ſolution of ſalts in water, and in extracts of gums, or reſins, made with volatile ſalts, wine, or ſpirits of wine, it may be ſafely omitted. The college of London have, in their diſpenſatory, as well according to the laſt edition as the former, uſed the word digeſtion in a ſenſe different from the above definition, meaning by it only the ſuffering the ingredients of certain mixtures to be continued together without applying the uſe of heat, which they expreſly order on each occaſion to be applied or omitted, by ſaying, *digeſt with heat*, or *digeſt without heat*: this is confounding the ſenſe of the word digeſt, with that of the word infuſe. See the article INFUSION.

DIGESTION, among phyſicians, is uſed for maturation, or that ſtate of a diſeaſe, when the morbific matter is ſo changed in bulk, figure, coheſion, mobility, &c. by the uſe of proper medicines, or even by the force of nature, as to be leſs noxious and hurtful, and conſequently to abate the violence of the diſtemper. See the article DIGESTIVE.

DIGESTION, in ſurgery, is the diſpoſing of an ulcer or wound to ſuppurate, or to diſcharge good pus, by the application of proper medicines. See the next article.

DIGESTIVE, in medicine, ſuch remedies as ſtrengthen and increaſe the tone of the ſtomach, and aſſiſt in the digeſtion of foods. See the article DIGESTION.

To this claſs belong all ſtomachics and ſtrengthners, or corroborants.

DIGESTIVE, in ſurgery, ſuch medicines as are applied to wounds, &c. in order to produce a good maturation and laudable diſpoſition of matter. Lenient, anodyne, and balſamic digeſtives, are to be applied to a gangrene. Digeſtives of turpentine, and the yolks of eggs, are uſeful in abſceſſes, wounds, and ulcers. See the article SUPPURATIVES.

DIGESTOR, in chemiſtry, a ſtrong veſſel made of copper, or iron, and fitted with a cloſe cover and ſcrews; ſo as to remain perfectly tight in a conſiderable degree of heat, whilſt water, common air, and the ſubject of the operation are contained therein. See the article DIGESTION.

The cover of the digeſtor ſhould always be provided with a valve to let out the ſteam, otherwiſe the veſſel will certainly burſt, whereby it may prove fatal to the by-ſtanders.

Of all chemical veſſels hitherto invented, the digeſtor ſeems beſt calculated for increaſing the action of menſtruums. Water, confined in a digeſtor, is ſuſceptible of ſo much heat, as to melt lead; and it is frequently found to melt the ſolder of lead and tin, wherewith the copper veſſel was held together: here appears the neceſſity of uſing hard ſolder, made of ſpelter, or ſilver and braſs, for this purpoſe; otherwiſe, the digeſtor cannot contain the water, when much heated, without melting in the joints.

In this veſſel, freſh ox-bone will be ſo digeſted in the ſpace of a quarter of an hour, as to become ſoft and tender, and capable of being cut with a knife; and the water, in which it was boiled, turned into a hard jelly, and a large cake of fat on its ſurface, when all is properly cooled.

DIGGING, among miners, is appropriated to the operation of freeing any kind of ore from the bed or ſtratum in which it lies, where every ſtroke of their tools turns to account; in contradiſtinction to the openings made in ſearch of ſuch ore, which are called hatches or eſſay-hatches, and the operation itſelf, tracing of mines, or hatching. See the articles TRAINING and MINE.

When a bed of ore is diſcovered, the beele-men, ſo called from the inſtrument they uſe, which is a kind of pick-ax, free the ore from the foſſils around it, and the ſhovel-men throw it up from one ſhamble to another, till it reaches the mouth of the hatch.

In ſome mines, to ſave the expence as well as fatigue of the ſhovel-men, they raiſe the ore by means of a winder, and two buckets, one of which goes up as the other comes down.

Digging a badger, among hunters, is diſlodging or raiſing him out of the earth.

DIGIT, digitus, in aſtronomy, the twelfth part of the diameter of the ſun or moon, is uſed to expreſs the quantity of an eclipſe. Thus an eclipſe is ſaid to be of ſix digits, when ſix of theſe parts are hid.

Digits, or **Monades**, in arithmetic, ſignify any integer under 10, as 1. 2. 3. 4. 5. 6. 7. 8. 9.

Digit is alſo a meaſure taken from the breadth of the finger. It is properly ¾ of an inch, and contains the meaſure of four barley corns laid breadth-wiſe.

DIGITALIS, fox-glove, in botany, a genus of the didynamia angioſpermia claſs of plants, with a monopetalous and campanulated, or bell-faſhioned flower, quadrifid at the edge: the fruit is an oval, acuminated, and bilocular capſule, containing a great number of ſmall ſeeds. See plate LXXII. fig. 6.

The leaves and flowers of this plant, the only parts uſed in medicine, are reputed emetic and vulnerary.

DIGITATED, among botaniſts, an appellation given to compound leaves, each of which is compoſed of a number of ſimple foliola, placed regularly on a common petiole; though, ſtrictly ſpeaking, there muſt be more than four foliola to make a digitated leaf. See plate LXXIII. fig. 7.

DIGLYPH, in architecture, a kind of imperfect triglyph, conſole, or the like, with two channels or engravings, either circular or angular. See the article Triglyphs.

DIGNE, a city and biſhop's ſee of Provence, in France, fifty-five miles north of Toulon: eaſt long. 6° 5′, and north lat. 44° 6′.

DIGNITARY, in the canon law, a perſon who holds a dignity, that is, a benefice which gives him ſome pre-eminence over mere prieſts and canons. Such is a biſhop, dean, arch-deacon, prebendary, &c. See Bishop, Dean, &c.

DIGNITY, as applied to the titles of noblemen, ſignifies honour and authority. As the omiſſion of a name of dignity may be pleaded in abatement of a writ; ſo may it be where a peer or nobleman, who has more than one name of dignity, is not named by that which is moſt noble.

Dignity, in the eccleſiaſtical ſenſe, is defined by canoniſts, an adminiſtration joined with juriſdiction and ſome power. Simple prebendaries, therefore, without juriſdiction, are not dignities.

Dignities are ſometimes ſimple, ſometimes with cure of ſouls, and ſometimes with juriſdiction and adminiſtration of ſacred things. Camden reckons in England, including prebends, 544 eccleſiaſtical dignities. See the article Dignitary.

DIGYNIA, in the linnæan ſyſtem of botany, an order of plants, or a ſubdiviſion occurring in moſt of the claſſes eſtabliſhed by Linnæus, intimating the plant to have two ſtyles. See the article Botany.

DIHELIOS, in aſtronomy, a name given by Kepler to that ordinate of the ellipſis which paſſes through the focus, where the ſun is ſuppoſed to be placed.

DIJAMBUS, in antient poetry, a double iambus. See the article Iambus.

DIJON, the capital of the province of Burgundy, in France, ſituated on the river Ouche, 140 miles ſouth eaſt of Paris: eaſt long. 5° 5′, and north lat. 47° 15′.

DIKE, a ditch, or drain, made for the paſſage of waters. See the article Ditch, &c.

Dike alſo ſignifies a work of ſtone, timber, earth, faſcines, &c. raiſed to oppoſe the entrance of the waters of the ſea, a river, lake, &c.

The moſt ſtupendous works of this kind are the Dikes of Holland. See the article Sluice.

Dike-reeve, an officer who takes care of the dikes and drains in Lincolnſhire.

DILAPIDATION, in law, a waſteful deſtroying or letting buildings, eſpecially parſonage houſes, &c. run to decay, for want of neceſſary reparation. If the clergy neglect to repair the houſes belonging to their benefices, the biſhop may ſequeſter the profits thereof for that purpoſe. And in theſe caſes, a proſecution may be brought either in the ſpiritual court, or at common law, againſt the incumbent himſelf, or againſt his executor or adminiſtrator.

DILATATION, in phyſics, a motion of the parts of any body, by which it is ſo expanded as to occupy a greater ſpace. This expanſive motion depends upon the elaſtic power of the body, whence it appears that dilatation is different from rarefaction,

faction, this laſt being produced by the means of heat. See the article RAREFACTION.

Gaſſendus and his followers affirm, that dilatation, by whatever cauſe it is produced, cannot happen without vacuities interſperſed in the parts of the expanded body; on the other hand, the Carteſians teach that dilatation is performed by the intruſion or intromiſſion of ſome ſubtile matter into the pores of the dilated body.

The moderns obſerve, that bodies, which being compreſſed, and afterwards left at liberty to reſtore themſelves perfectly, endeavour to dilate themſelves with the ſame force, whereby they were compreſſed, and accordingly they ſuſtain a force, and raiſe a weight equal to that by which they were compreſſed. They likewiſe remark, that bodies in dilating by their elaſtic power, exert a greater force at the beginning of their dilatation than towards the end, as being at firſt more compreſſed: and the greater the compreſſion, the greater the elaſtic power and energy of dilatation. Wherefore theſe three, the compreſſing power, the compreſſion, and the elaſtic power, are always equal. Again, the motion whereby compreſſed bodies reſtore themſelves is for the moſt part accelerated. Thus an arrow ſhot from a bow does not quit the ſtring till after it be perfectly reſtored to its natural ſtate; nor does the arrow move ſwifter than the ſtring: and if the ſtring before it hath perfectly reſtored itſelf be ſtopped, the arrow will not go its full length; a proof that it is continually acquiring a new impetus from the ſtring.

It may however happen, that where the compreſſion is only partial, the motion of dilatation ſhall not be accelerated, but retarded, as appears in the compreſſion of ſoft bread, ſpunge, gauze, &c.

DILATATION, in ſurgery and anatomy, denotes the widening the orifice of a wound; or the diſtenſion of any veſſel, or the like.

DILATATORES, in anatomy, a name given to ſeveral muſcles in the human body; as, 1. Dilatores alæ naſi, a pair of muſcles which ſerve to elevate the noſe, and are very various in different ſubjects. In general, however, they are two on each ſide, though even in this they vary extremely, and ſometimes are ſo thin and fine as ſcarce to be perceptible. They are alſo called the pyramidalis and myrtiformis. See the article PYRAMIDALIS, &c.

2. Dilatatores urethræ, of which the tranſverſi ariſe from the tubercle of the os iſchium on each ſide, and are inſerted into the poſterior part of the bulb of the urethra: they are not quite determinate and certain, however, either in their origin or inſertion, and ſometimes they are wholly wanting. When they act they dilate the urethra in its poſterior part. The dilatator poſticus ariſes from the anterior part of the ſphincter of the anus, and is inſerted into the poſterior and lower part of the acceleratores, or elſe into the lower part of the bulb of the urethra. Some have taken this muſcle for a part of the ſphincter ani. See the article SPHINCTER.

DILEMMA, in logic, an argument conſiſting of two or more propoſitions, which divides the whole into all its parts, or members, by a disjunctive propoſition, and then infers ſomething concerning each part, which is finally referred to concerning the whole.

Inſtances of this are frequent, as, "In "this life we muſt either obey our vicious inclinations, or reſiſt them: to "obey them will bring ſin and ſorrow; "to reſiſt them is laborious and painful: "therefore, we cannot be perfectly free "from ſorrow and pain in this life." A dilemma becomes faulty or ineffectual three ways. Firſt when the members of the diviſion are not well oppoſed, or not fully enumerated: for then the major is falſe. Secondly, when what is aſſerted concerning each part is not juſt, then the minor is not true. Thirdly, when it may be retorted with equal force upon him who utters it. There was a famous antient inſtance of this caſe, wherein a dilemma was retorted. Euathlus promiſed Protagoras a reward when he had taught him the art of pleading; and it was to be paid the firſt day he gained any cauſe in court. After a conſiderable time, Protagoras goes to law with Euathlus for the reward, and uſes this dilemma. "Either the cauſe will "go on my ſide or on yours: if the "cauſe goes on my ſide, you muſt pay "me according to the ſentence of the "judge: if the cauſe goes on your "ſide, you muſt pay me according to

“ your bargain. Therefore, whether the cauſe goes for me, or againſt me, you muſt pay the reward.” But Euathlus retorted the dilemma thus. “ Either I ſhall gain the cauſe, or loſe it. If I gain the cauſe, then nothing will be due to you according to the ſentence of the judge: but if I loſe the cauſe, nothing will be due to you according to my bargain. Therefore, whether I loſe or gain the cauſe, I will not pay you, for nothing will be your due.”

A dilemma is uſually deſcribed, as tho' it always proved the abſurdity, inconvenience, or unreaſonableneſs of ſome opinion or practice, and this is the moſt common deſign of it. But it is plain, that it may be uſed to prove the truth or advantage of any thing propoſed. As, “ In heaven we ſhall either have deſires, or not: if we have no deſires, then we have full ſatisfaction: if we have deſires, they ſhall be ſatisfied as faſt as they ariſe: therefore, in heaven we ſhall be completely ſatisfied.”

This ſort of argument may be compoſed of three or more members, and may be called trilemma. It is alſo called *ſyllogiſmus cornutus*, a horned ſyllogiſm; its horns being ſo diſpoſed, that if you avoid the one, you run againſt the other. It is alſo called crocodilinus, by reaſon that as the crocodile leads ſuch as follow it, into the Nile, and purſues ſuch as fly it, to deſtroy them; ſo, whatever the adverſary either affirms or denies in this kind of ſyllogiſm, is turned to his advantage.

DILL, ANETHUM, in botany, a genus of the pentandria digynia claſs of plants, the compound flower of which is uniform; the particular ones all conſiſting of five lanceolated petals, bending inwards: the fruit is naked, ovated, compreſſed, and ſeparable into two parts; and the ſeeds are two in number, ſuboval, convex, and ſtriated on one ſide, and plane on the other.

To this genus Linnæus likewiſe refers fennel, which differs only from dill, in that its ſeeds are not membranaceous at the edge, like thoſe of dill.

The ſeeds of dill are recommended as good carminatives.

DILLEMBURG, a city of the circle of the Upper Rhine, in Germany, about forty miles north of Francfort, and ſubject to the houſe of Naſſau: eaſt longitude 8° 8′, and north latitude 50° 45′.

DILLENGEN, a city of Swabia, in Germany, ſituated on the Danube, about twenty miles north eaſt of Ulm: eaſt long. 10° 20′, and north lat. 48° 40′.

DILLENIA, in botany, a genus of the polyandria-polygynia claſs of plants; the corolla of which conſiſts of five coriaceous, large, roundiſh, and hollow petals: the fruit is roundiſh, and externally covered with a number of capſules, which are oblong, and divided by a furrow; within, there is a large column or pulpous receptacle: the ſeeds are numerous, and very ſmall; and nidulated underneath the capſules.

DILUTING, in chemiſtry, is to render a body liquid; or, if it were liquid before, to render it more ſo, by the addition of a thinner thereto. Theſe things thus added, are called diluents, or dilutors. It is requiſite for a diluent, that it be fluid, that it be more fluid than the liquor to be diluted; and finally, that it retain its fluidity after a mixture. It is obſerved, that there is no body endued with theſe three properties beſides water. Wine indeed is ſaid to dilute; but its diluent power depends on its quality, joined with its ſtimulating force. Water, if it be made warm, dilutes the more.

DIMENSION, in geometry, is either length, breadth, or thickneſs; hence a line hath one dimenſion, *viz.* length; a ſuperficies two, *viz.* length and breadth; and a body, or ſolid, has three, to wit, length, breadth and thickneſs.

DIMENSION is alſo uſed with regard to the power of the roots of an equation, which are called the dimenſions of that root; as in a cubic equation, the higheſt power has three dimenſions, *&c.*

DIMINISHED COLUMN, in architecture. See the article COLUMN.

DIMINISHED INTERVAL, in muſic, is a defective interval, or an interval that is ſhort of its juſt quantity, by a leſſer ſemitone, *&c.* See the article INTERVAL.

DIMINUTION, in architecture, a contraction of the upper part of a column, by which its diameter is made leſs than that of the lower part.

It generally commences from one third of the height of the column.

Vitruvius would have the diminution of columns different according to their height, and not according to their diameter. But this rule is not found to have been obſerved in the antique. Mr. Perrault obſerves, that a difference of orders does not infer a difference in diminutions, and Mr. Le Clerc ſays, all diminutions of columns ought to be more or leſs ſenſible according as the orders are more or leſs delicate. For inſtance, in the Tuſcan order, where the column is fifteen modules high, the diminution under the aſtragal may be five minutes and a half. In the Doric order, where the column is ſixteen modules, the diminution may be but five minutes. In the Ionic, where the column is eighteen modules, the diminution may be but four minutes and a half; and in the Corinthian, no more than four. Diminutions are as differently adjuſted in antique buildings, as in different modern authors.

DIMINUTION, in heraldry, a term uſed for what the french call briſures, and we denominate differences more uſually. See the article DIFFERENCE.

DIMINUTION, in law, is where the plaintiff or defendant in a writ of error alledges to the court, that part of the record remains in the inferior court not certified, and therefore prays, that it may be certified by certiorari. Diminution cannot be alledged of what is fully certified, but of ſomething that is wanting, as the want of an original, or a warrant of attorney.

DIMINUTION, in muſic, is when there are ſeveral words which are to make tones, and ſeveral quick motions in a cadence, ſeveral quavers, ſemi-quavers, *&c.* correſponding to a crotchet or minum, as when a ſemi-breve is divided into two minims, four crotchets, *&c.* Of this there are ſeveral kinds, and if done in conjoint degrees, it is called trilli, tremoli, circoli mezzi, group, tirate, and if in diſjoint degrees, it is ſaid to be done per ſalto.

DIMINUTION, in rhetoric, the exaggerating what you have to ſay by an expreſſion that ſeems to diminiſh it.

DIMINUTIVE, in grammar, a word formed from ſome other, to ſoften or diminiſh the force of it, or to ſignify a thing is little in its kind. Thus cellule is a diminutive of cell, globule of globe, hillock of hill. The Italians abound in diminutives: the French are a good deal more reſerved: in engliſh we have very few. The Latins, and eſpecially Catullus, uſe them as expreſſions of blandiſhment, and in that language, as well as in the Italian, French and Engliſh, they are generally formed from primitives by the addition of a few letters or ſyllables. They have a very pretty effect in that celebrated addreſs of Adrian to his departing ſoul, which begins,

Animula, vagula, blandula,
Hoſpes comeſque corporis, &c.

DIMISSORY LETTERS, in the antient chriſtian church, were letters granted to the clergy, when they were to remove from their own dioceſe, and ſettle in another, to teſtify that they had the biſhop's leave to depart. In the canon-law, dimiſſory letters are ſuch as are uſed when a candidate for holy orders has a title in one dioceſe, and is to be ordained in another: in which caſe the proper dioceſan ſends his letters directed to the ordaining biſhop, giving leave that the bearer may be ordained to ſuch a cure within his diſtrict. Perſons inferior to biſhops cannot grant theſe letters, unleſs by ſpecial commiſſion; or unleſs the biſhop be at a great diſtance, in which caſe the vicar general may grant ſuch licence; as the chapter may do, *ſede vacante.*

DIMOERITÆ, in church-hiſtory, a name given to the Apollinarians, from their ſeparating the underſtanding from the human ſoul of Chriſt.

DIMNESS OF SIGHT, a diſorder in horſes, proceeding from blood-ſhotten eyes. If the ball of the eye be ſound, the cure is effected by keeping the horſe warm, with a hood of linen cloth fitted to his head; and anointing the eyelids twice a day, with a compoſition of ſugar-candy, honey, and white roſe-water. In two or three days, the eyes will be well again, after which the creature ſhould be blooded.

In this diſorder, you ought by no means to clip or meddle with the bladders on any part of the eye.

DINANT, a town of Germany, in the biſhopric of Liege, ſituated on the river Maeſe, about 12 miles ſouth of Namur: eaſt long. 4° 50′, and north lat. 50° 18′.

DINANT is alſo the name of a town of Brittany, in France, about ten miles ſouth of St. Malo: weſt longitude 2° 5′, and north latitude 48° 30′.

DINGELFING, a town of Bavaria, in Germany, ſituated on the river Iſer, twenty miles ſouth of Landſhut: eaſt longitude 12° 40′, and north latitude 48° 30′.

DINGLE, a port town of Ireland, in the county of Derry, and province of Munſter, ſituated on Dingle-bay, 74 miles weſt of Limerick: weſt longitude 10° 18′, and north latitude 52°.

DINGWEL, or **DINGWAL**, a parliament-town of Scotland, ſituated at the weſt end of the Cromarty-bay, in the county of Roſs: weſt longitude 4° 15′, north latitude 57° 56′.

It claſſes with Dornoch, Wick, and Kirkwall.

DINKELSPIEL, a city of Swabia, about forty miles north of Ulm, eaſt long 10° 12′, and north lat. 49°.

DINNER, the meal taken about the middle of the day.

It is generally agreed to be the moſt ſalutary to make a plentiful dinner, and to eat ſparingly at ſupper. This is the general practice among us. The French, however, in imitation of the antient Romans, defer their good cheer to the evening, and Bernardinus Paternus, an eminent italian phyſician, maintains it to be the moſt wholeſome method, in a treatiſe expreſsly on the ſubject.

The grand Tartar, emperor of China, after he has dined, makes publication by his heralds, that he gives leave for all the other kings and potentates of the earth to go to dinner, as if they waited for his leave.

DIOCESE, denotes a particular diſtrict, or diviſion, under the direction and government of a biſhop.

It is the general opinion, that the chriſtian church, in the modelling her own external polity, followed the ſtate and diviſion of the roman empire, and that the eccleſiaſtical magiſtracy was originally formed upon the plan of the civil. As the empire therefore was divided into provinces and dioceſes, (a dioceſe, according to Conſtantine's diſtribution, comprehending ſeveral provinces under the direction of a general magiſtrate) ſo the church ſet up her metropolitical and patriarchal power, the metropolitan biſhops anſwering to the civil maſtriſtrates of provinces, and the patriarchs to the civil magiſtrates of dioceſes. This is to be underſtood of the ſtate of the church, after the empire became chriſtian. See the articles METROPOLITAN, PATRIARCHS, PROVINCE, *&c.*

Some pretend that a dioceſe, during the three firſt centuries, was never more than ſuch a number of people as could meet, and ordinarily did meet, in a ſingle congregation: others extend the limits of the antient dioceſes, ſo as to include a whole city, and the region about it. And this is the plain reaſon of that great difference we find in the extent of antient dioceſes, ſome being very large, others very ſmall, according as each city happened to have a larger or leſſer territory under its juriſdiction. Dioceſes were originally called παροικιαι, pariſhes, by which name is to be underſtood the epiſcopal city, with the country places and villages round it. The name dioceſe began firſt to be uſed in the fourth century, when the exterior polity of the church began to be formed upon the model of the roman empire.

England, in regard to its eccleſiaſtical ſtate, is divided into two provinces, *viz.* Canterbury and York, and each province into ſubordinate dioceſes, of which there are twenty-two in England, and four in Wales.

DIOCLESIAN EPOCHA, in chronology. See the article EPOCHA.

DIOCLIA, Διοκλεια, in grecian antiquity, a feſtival kept in honour of Diocles, who died in defence of a youth he loved.

DIOCTAHEDRIA, in natural hiſtory, a genus of pellucid and cryſtalliform ſpars, compoſed of two octangular pyramids, joined baſe to baſe, without any intermediate column. Of theſe ſome have long pyramids, others ſhort and ſharp-pointed ones, and others ſhort and obtuſe-pointed ones; the two former ſpecies being found in the Hartz-foreſt, and the laſt in the mines of Cornwal.

DIODIA, in botany, a genus of the didynamia-angioſpermia claſs of plants, the corolla of which conſiſts of a ſingle petal, of the ringent kind. The tube is ſlender and longer than the cup, the upper lip is erect and bifid, the lower lip is patent, and divided into two lanceolated ſegments. The fruit is an oval quadrangular capſule, coronated, formed of two valves, and containing two cells: the ſeeds are ſingle, of an ovato-oblong figure, ſmooth and flat on one ſide, and convex on the other.

DIOECIA, in the linnæan ſyſtem of botany, the twenty-ſecond claſs of plants, comprehending all thoſe which have the male and female parts of fructification, or the ſtamina and piſtil, on diſtinct plants of the ſame kind; in which reſpect, they bear ſome analogy to quadrupeds, whoſe males and females are likewiſe diſtinct. See BOTANY.

To this claſs belong the willow, hemp, poplar, juniper, piſtacchia, yew, *&c.* in all which, the female plants alone produce ſeeds; but even theſe prove barren, unleſs planted near the male plants, ſo as to be within the reach of the farina fœcundans. See FARINA FOECUNDANS.

DIOMEDIS AVIS, in ornithology, a bird of the duck-kind, about the ſize of the common hen, and of a duſky brown colour, ſaid to be peculiar to the iſland Diomedia, or Tremiti, in the gulph of Venice.

DIONYSIA, in grecian antiquity, ſolemnnities in honour of Διονυσος, or Bacchus, ſometimes called by the general name of orgia; and by the Romans, bacchanalia, and liberalia. See BACCHANALIA, *&c.* There were diver, Dionyſia obſerved, over all Greece: but thoſe celebrated at Athens had more ſplendor and ceremonious ſuperſtition than in any other part; for the years were numbered by them: the chief archon had a ſhare in the management of them, and the prieſts that officiated therein, were honoured with the firſt ſeat at public ſhews. But at firſt, they were without ſplendor and ornaments, being days ſet apart for public mirth, and obſerved only with the following ceremonies: firſt a veſſel of wine, adorned with a vine branch, was brought forth, after that followed a goat; then was carried a baſket of figs; and after all the phalli. At ſome of them, it was uſual for the worſhippers in their garments and actions to imitate the poetical fictions concerning Bacchus. They put on fawn ſkins, fine linen and mitres, carried thyrſi, drums, pipes, flutes, and rattles, and crowned themſelves with garlands of trees, ſacred to Bacchus, ſuch were the ivy, vine, fir, *&c.* Some imitated Silenus, Pan, and the Satyrs; expoſing themſelves in comical dreſſes, and antic motions: ſome rode upon aſſes, others drove goats to the ſlaughter. In this manner, perſons of both ſexes ran about the hills, deſarts, and other places, wagging their heads, dancing in ridiculous poſtures, filling the air with hideous noiſes and yelling, perſonating people diſtracted, and crying aloud, Εὐοι Σαβοι εὐοῖ, Βακχε, or ὦ Βακχε, or Ιοβακχε, or Ιω Βακχε.

In ſome of the feſtivals, a company of men called Περιφαλλια, carried long poles, at the end of which were fixed things in form of a man's privities. The λικνον, or myſtical fan of Bacchus, was a thing eſſential to all his feaſts.

DIONYSIACA, in grecian antiquity, an appellation given to all manner of theatrical entertainments, from their being ſacred to Dionyſius, or Bacchus.

DIONYSIAN PERIOD, in chronology. See the article PERIOD.

DIOPTER, DIOPTRA, a name ſometimes uſed for the hole pierced in ſights of mathematical inſtruments. See the article SIGHTS.

DIOPTRA, among ſurgeons, the ſame with ſpeculum. See SPECULUM.

DIOPTRICS, the ſcience of refractive viſion, or that part of optics which conſiders the different refractions of light in its paſſing through different mediums, as air, water, glaſs, *&c.* and eſpecially lenſes. See the articles REFRACTION, LENS, *&c.*

DIOSCOREA, in botany, a genus of the dioecia-hexandria claſs of plants, having no corolla in either the male or female flowers: the fruit is a compreſſed large capſule, of a triangular form, containing three valves, and divided into three cells: the ſeeds are two, compreſſed, and ſurrounded, with a large membranaceous margin.

DIOSCURIA, διοσκουρια, in grecian antiquity, a feſtival kept in honour of the Dioſcuri, or Caſtor and Pollux, wherein the aſſiſtants ſhared plentifully of the gifts of Bacchus.

DIOSMA, in botany, a genus of the pentandria-monogynia claſs of plants, the flower of which conſiſts of five obtuſely ovated, ſeſſile, and erecto-patent petals, of the length of the cup: the fruit is compoſed of five capſules, adhering together by their inner ſides, and containing each a ſingle, oblong, and ſharp-pointed oval ſeed.

DIOSPYROS, DATE-PLUM, in botany, a genus of the octandria-digynia claſs of plants, called by Turnefort, guaiacana, the flower of which is monopetalous, very ſmall, and of an oval campanulated figure: the fruit is a large globoſe and multilocular berry, containing a few ſharp-pointed oval ſeeds. See plate LXXIII. fig. 1.

DIPHRYGES, in antient pharmacy, the ſcoriæ, ſediment, or calx of melted copper, gathered in the furnace, when the metal was run out.

There are ſuppoſed to be three ſpecies of diphryges, one made of a clay, or bole dried in the ſun; another made of marcaſite, or pyrites burnt; and a third, that of the fæces of copper. See the article COPPER.

The laſt diphryges, which taſtes of copper, is æruginous, aſtringent, and vehemently drying upon the tongue, qualities

of

Vol II *facing page 939* Plate LXXIII

Fig. 1. DIOSPYROS.

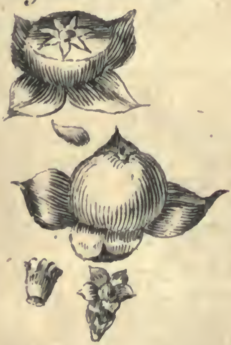


Fig. 2. DIPSACUS, *TEASEL.*

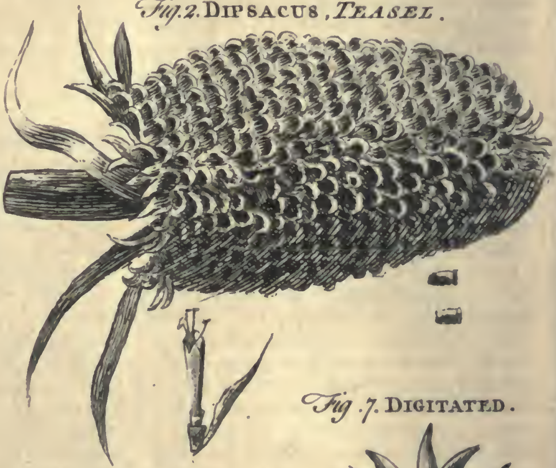


Fig. 7. DIGITATED.

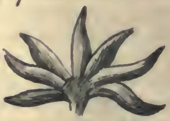


Fig. 3. DIRECTOR

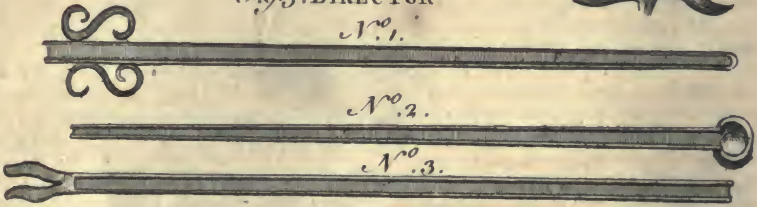


Fig. 5. DISPLAYED.

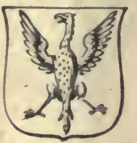


Fig. 4. DIRIGENT.

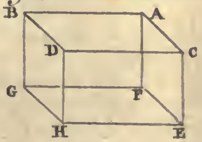
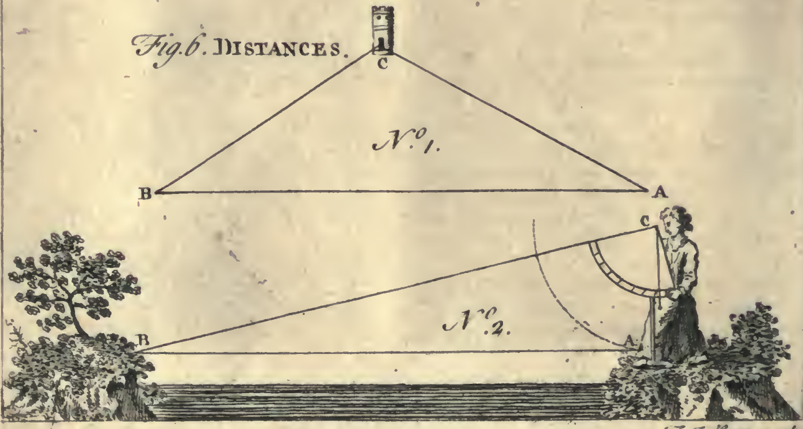


Fig. 6. DISTANCES.



T. Jefferys sculp

of which burnt oker, though ſold for diaphryges, is deſtitute. It is an aſtringent, a potent cleanſer, abſterſive and drier, repreſſes excreſcences of fleſh, induces malignant and ſpreading ulcers to cicatrize, and mixed with turpentine, or cerate, diſcuſſes an abſceſs.

DIPHTHONG, δίφθογγος, in grammar, a double vowel, or the mixture of two vowels pronounced together, ſo as to make one ſyllable. See the article VOWEL.

The Latins pronounced the two vowels in their diphthongs, *ae* or *æ*, *oe* or *œ*, much as we do, only that the one was heard much weaker than the other, tho' the diviſion was made with all the delicacy imaginable. Diphthongs, with regard to the eyes, are diſtinguiſhed from thoſe with regard to the ears: in the former, either the particular ſound of each vowel is heard in the pronunciation, or the ſound of one of them is drowned; or, laſtly, a new ſound, different from either, reſults from both: the firſt of theſe only are real diphthongs, as being ſuch both to the eye and the ear. Diphthongs with regard to the ear are either formed of two vowels, meeting in the ſame ſyllable, or vowels whoſe ſounds are ſeverally heard; or of three vowels in the ſame ſyllable, which only afford two ſounds in the pronunciation. Engliſh diphthongs, with regard to the eye and ear, are *ai*, *au*, *ea*, *ee*, *oi*, *oo*, *ou*. Improper engliſh diphthongs, with regard to the eye only, are *aa*, *ea*, *eo*, *eu*, *ie*, *ei*, *oa*, *oe*, *ue*, *ui*.

DIPLASIASMUS, in medicine, a reduplication of diſeaſes.

This word is alſo uſed for two muſcles of the arm, which ſerve to turn it round.

DIPLOE, in anatomy, the ſoft meditullium, or medullary ſubſtance, which lies betwixt the two laminæ of the bones of the cranium. See the article CRANIUM.

DIPLOMA, an inſtrument or licence given by colleges, ſocieties, &c. to a clergyman to exerciſe the miniſterial function, or to a phyſician to practiſe the profeſſion, &c. after paſſing examination, or admitting him to a degree.

DIPLOMA, in chemiſtry, &c. a double veſſel. To boil in diplomate, is to ſet one veſſel, containing the ingredients intended to be acted upon, in another larger veſſel, full of water, and to this laſt the fire is to be applied.

DIPONDIUS, in the ſcripture-language, is uſed by St. Luke to ſignify a certain coin, which was of very little value: our tranſlation of the paſſage is, *Are not two ſparrows ſold for two farthings?* In St. Matthew, who relates the ſame thing, we read, *Are not two ſparrows ſold for a farthing?* The greek reads *aſſarion* inſtead of *as*. See AS.

Dr. Arbuthnot ſays that this coin was at firſt *libralis*, or of a pound weight, and that even when diminiſhed, it retained the name *libella*; ſo that dipondius denoted two aſes.

DIPPING, among miners, ſignifies the interruption, or breaking off, of the veins of ore; an accident that gives them a great deal of trouble before they can diſcover the ore again.

DIPPING NEEDLE, or INCLINATORY NEEDLE. See the article NEEDLE.

DIPSACUS, TEASEL, in botany, a genus of the tetrandria-monogynia claſs of plants, the flower of which conſiſts of only one tubular erect petal, divided into four ſegments at the mouth; its fruit is a common receptacle, of a conical figure, beſet with long ſcales, and containing a ſingle columnar ſeed with a marginaceous rim. See plate LXXIII. fig. 2.

The leaves of wild teaſel are recommended againſt flatulencies, and crudities of the ſtomach.

DIPTERA, in the hiſtory of inſects, that order of inſects which have only two wings, and under each of them a ſtyle or oblong body, terminated by a protuberance, or head, and called a balancer.

DIPTERE, or DIPTERON, in the antient architecture, ſignified a temple ſurrounded with two rows of columns, which form a ſort of porticos, called wings, or iſles. Pſeudo-diptere is the ſame, except that inſtead of the double row of columns, this was only encompaſſed with a row of ſingle ones.

DIPTOTES, in grammar, are ſuch nouns as have only two caſes, as *ſuppetiæ*, *ſuppetias*, &c.

DIPTYCHA, διπτυχα, in antiquity, a public regiſter, in which were written the names of the conſuls and other magiſtrates among the heathens; and among the chriſtians, they were a ſort of tablets, on one of which were written the names of the deceaſed, and on the other thoſe of the living patriarchs, biſhops, &c. or thoſe who had done any ſervice to the church, for whom prayers were offered, the deacon reading the names at maſs.

It is certain there were prophane diptycha in the greek empire, as well as ſacred ones in the greek church. The prophane diptycha were frequently ſent as a preſent to princes, &c. on which occaſion they were finely gilt and embelliſhed, and uſually of ivory. Carrion ſuppoſes that ſuch preſents were at firſt made to perſons who had been nominated quæſtors, to whom they were uſeful. Hence aroſe the cuſtom of diptycha in the antient chriſtian church; where ſome diſtinguiſh three ſorts of diptycha, one wherein the names of biſhops only were written, ſuch eſpecially as had been governors of that particular church; a ſecond, in which the names of the living were written, ſuch in particular as were eminent for any office or dignity, or ſome benefaction or good work, in which rank were biſhops, emperors, and magiſtrates: laſtly, a third, containing the names of ſuch as were deceaſed in catholic communion. To eraſe a perſon's name out of theſe books, was the ſame thing as declaring him a heretic, or ſome way deviating from the faith.

DIRCA, in botany, a genus of the octandria monogynia claſs of plants, without any calyx; the corolla conſiſts of a ſingle clavated petal; the fruit is a berry, in which is a ſingle cell, containing only one ſeed.

DIRECT, in arithmetic. The rule of three direct, is oppoſite to the rule of three inverſe. See the articles RULE OF THREE and PROPORTION.

DIRECT, in aſtronomy. A planet is ſaid to be direct, when it appears to an obſerver on the earth to go forward in the zodiac, or according to the ſucceſſion of the ſigns. See the article PLANET.

DIRECT, in matters of genealogy, is underſtood of the principal line, or the line of aſcendants and deſcendants; in contradiſtinction to the collateral line. The heirs in the direct line always precede thoſe in the collateral lines.

DIRECT RAY, in optics, is a ray flowing from a point of a viſible object directly to the eye, thro' one and the ſame medium.

DIRECT *eaſt and weſt dials*, dials drawn upon planes that directly face the eaſt and weſt points of the horizon, or parallel to the meridian. See the article DIAL.

DIRECT *ſouth and north dials* are thoſe which face directly the north and ſouth points of the horizon, or parallel to the prime vertical circle. See the articles DIAL and DIALLING.

DIRECTION, in mechanics, ſignifies the line or path of a body's motion, along which it endeavours to proceed, according to the force impreſſed upon it. See the articles LINE and MOTION.

Angle of DIRECTION, that formed by the lines of direction of two conſpiring powers.

Quantity of DIRECTION, a term uſed by ſome mathematicians for the product of the velocity of the common center of gravity of a ſyſtem of bodies, by the ſum of their quantities of matter: this is nowiſe altered by any colliſions among the bodies themſelves.

Magnetical DIRECTION denotes the tendency of the load-ſtone, and other magnetic bodies, to certain points called their poles: thus, a magnetical needle always preſents one of its ends towards the north pole of the world, and the other towards the ſouth pole.

DIRECTOR, in commercial polity, a perſon who has the management of the affairs of a trading company: thus we ſay the directors of the India-company, South ſea-company, &c. See the article COMPANY.

The directors are conſiderable proprietors in the ſtocks of their reſpective companies, being choſen by plurality of votes from among the body of proprietors. The dutch Eaſt-india company have ſixty ſuch directors; that of France, twenty-one; the britiſh Eaſt-india company has twenty-four, including the chair-man, who may be re-elected for four years ſucceſſively. Theſe laſt have ſalaries of 150 l. a year each, and the chair-man 200 l. They meet at leaſt once a week, and commonly oftener, being ſummoned as occaſion requires.

But beſides theſe directors, who reſide in Europe, and there ſuperintend the general œconomy of the trading companies, there are alſo officers belonging to them in Aſia, Africa, and America, under the title of directors-general, and, by an honourable abbreviation, generals. The Engliſh give theſe the title of preſidents, whereof there uſed to be two in the Eaſt-indies, one at Surat, and the other at Bantam. They have the abſolute diſpoſal of all the company's effects, regulate their trade, eſtabliſh new compting-houſes, and command all the merchants, and even captains of ſhips; make preſents to princes, treat with them, make peace and war with them, &c. It is true, they have a council, but one entirely ſubſervient to their pleaſure.

DIRECTOR, in ſurgery, a grooved probe, to direct the edge of the knife or ſciſſars, in opening ſinuſes, or fiſtulæ, that by this means the ſubjacent veſſels, nerves, and tendons may remain unhurt. The ornament at the upper part of it, ſee plate LXXIII. fig. 3. n° 1. ſerves for a handle; though ſometimes that end is made in the form of a ſpoon, as in n° 2. to contain powders to ſprinkle upon wounds or ulcers: ſometimes alſo it is forked at the end, to divide the frænum of the tongue, as in n° 3.

Director, in anatomy, the ſame with the erector penis. See Erector.

DIRIGENT, or **Directrix**, a term in geometry, ſignifying the line of motion, along which the deſcribent line or ſurface is carried in the geneſis of any plane or ſolid figure: thus, if the line A B (plate LXXIII. fig. 4.) move along the line A C, ſo that the point A always keeps in the line A C, a parallelogram, as A B C D, will be formed, of which the ſide A B is the deſcribent, and the line A C the dirigent; ſo alſo, if the ſurface A B C D be ſuppoſed to be carried along C E, in a poſition always parallel to itſelf, in its firſt ſituation, the ſolid ADFH, will be formed, where the ſurface A D is the deſcribent, and the line C E the dirigent.

DIRITTA, in muſic, a term intimating that the piece is to be played or ſung in conjoint degrees: thus, contrapunto alla diritta, according to Angelo Berardi, is when one is obliged to raiſe or fall the voice by the ſame degree, *i. e.* by an equal number aſcending or deſcending, without making a leap, even of the interval of a third.

DIRSCHAW, or **Dirschau**, a town of Pruſſia, in the palatinate of Culm, ſituated upon the Viſtula, half way betweeen Dantzic and Ghnief.

DIS, an inſeparable particle prefixed to divers words, the effect whereof is either to give them a ſignification contrary to what the ſimple words have, as *diſoblige*, *diſobey*, &c. or to ſignify a ſeparation, detachment, &c. as *diſpoſing*, *diſtributing*, &c.

DISABILITY, in law, is when a perſon is rendered incapable of inheriting lands, or taking that benefit which otherwiſe he might have done.

Diſability may happen four ways, *viz.* by the act of an anceſtor, by the act of the party himſelf, by the act of God, or by the act of the law.

Diſability by the act of an anceſtor is where a man being attainted by treaſon or felony, his blood becomes corrupted, and thereby his children are rendered incapable to inherit.

Diſability by the act of the party, is when one binds himſelf by obligation, that, upon the ſurrender of a leaſe, he will grant a new eſtate of the ſame premiſes to the leſſee, and afterwards he grants over the reverſion to another, whereby he is diſabled to perform his obligation.

Diſability by the act of God, is where a perſon is not *ſanæ memoriæ*, not of ſound memory, which incapacitates him to make any grant, &c. and in all caſes where he gives or paſſes an eſtate from him, after his death, it may be diſannulled and made void; though it is a maxim in our law, that a man of full age ſhall never be received to diſable his own perſon.

Diſability by the act of the law, is where one, by the ſole act of law, without any thing done by him, is rendered incapable of the benefit of the law, as an alien born, &c.

There are alſo, by the common law, other diſabilities, as idiocy, infancy, and coverture, in reſpect to the making of grants, &c. and by ſtatute in many caſes; for papiſts are diſabled to make any preſentation to a church, or to purchaſe or take lands, &c. Officers not taking the oaths, to hold offices, &c.

DISARMING, in law, the prohibiting people to wear arms. See Arms.

It is an offence, by the common law of England, for perſons to go or ride armed with dangerous and uncommon weapons; though gentlemen may wear common armour, according to their quality. It is alſo ordained by ſtatute, that no perſons ſhall come before the king's juſtices with force of arms, on pain of impriſonment, &c.

Disarming *the lips of a horſe*, in the manege, is the preventing them from taking off the true preſſure or appui of the mouth, when they happen to be ſo large as to cover the bars.

DISBURDENING *of trees*, the taking off part of the leaves and fruit, when too numerous, that thoſe left may grow the larger.

DISC, *diſcus*, in antiquity, a quoit made of ſtone, iron, or copper, five or ſix fingers broad, and more than a foot long, inclining to an oval figure, which they hurled in the manner of a bowl, to a vaſt diſtance, by the help of a leathern thong tied round the perſon's hand who threw it, and put through a hole in the middle. Homer has made Ajax and Ulyſſes great artiſts at this ſport; and Ovid, when he brings in Apollo and Hyacinth playing at it, gives an elegant deſcription of this exerciſe, lib. x. ver. 175.

Disc, in aſtronomy, the body and face of the ſun and moon, ſuch as it appears to us on the earth; or the body or face of the earth, such as it appears to a ſpectator in the moon, *&c.* See Diameter.

The diſc in eclipſes is ſuppoſed to be divided into twelve equal parts, called digits: in a total eclipſe of the luminaries, the whole diſc is obſcured; in a partial eclipſe, only a part thereof.

If we imagine a plane to paſs through the center of the earth, ſo that the line which joins the centers of the ſun and earth, may be perpendicular to this plane, it will make on the ſurface of the earth a circle, which will ſeparate the illuminated hemiſphere of the earth from the dark. This circle, otherwiſe termed the circle of illumination, Mr. Keil calls the illuminated diſc of the earth, which is directly ſeen by a ſpectator placed at the diſtance of the moon, in the right line which joins the centers of the ſun and earth. All lines drawn from the center of the ſun to every ſingle point of the diſc are to be accounted parallel; and, therefore, ſince that line which is drawn to the center of the diſc is perpendicular to it, all the reſt will be perpendicular to it, and therefore all lines drawn from the center of the ſun, and paſſing through every point of any circle upon the earth's ſurface, when they are produced, will be perpendicular to the plane of the diſc. Moreover, a ſpectator in the moon will ſee all countries, cities, and towns to move upon the diſc, which motion is occaſioned by the earth's rotation round its axis, and every point will have its way on the diſc: the bigneſs of the earth's diſc is to be eſtimated by the angle under which the earth is ſeen from the moon. See Earth.

Disc, in botany, is an aggregate of florets forming, as it were, a plane ſurface.

Disc, in optics, is the width of the aperture of teleſcopic glaſſes, whatever their form be, whether plain, convex, concave, *&c.*

Disc, in the liturgy of the greek church, is nearly the ſame with the patena in the latin church.

DISCERNING, or **Discernment**, among logicians, a faculty of the mind, whereby it diſtinguiſhes between the ideas. See Judgment and Intuition.

On this depends the evidence and certainty of ſeveral, even general, propoſitions, which paſs for innate truths, that, in reality, proceed from this clear diſcerning faculty of the mind, whereby it perceives two ideas to be the ſame, or different. In being able nicely to diſtinguiſh one thing from another, conſiſts, in a great meaſure, that exactneſs of judgment, and clearneſs of reaſon; which is obſervable in one man above another. To the well diſtinguiſhing our ideas it chiefly contributes that they be clear and determinate; and when they are ſo, it will not breed any confuſion or miſtake about them, though the ſenſes ſhould convey them from the ſame object differently on different occaſions.

DISCIPLE, one who learns any thing from another: thus, the followers of any teacher, philoſopher, *&c.* are called diſciples. In the chriſtian ſenſe they were followers of Jeſus Chriſt, in general; but in a more reſtrained ſenſe, the diſciples denote thoſe alone who were the immediate followers and attendants on his perſon, of which there were ſeventy or ſeventy-two. The names *diſciple* and *apoſtle* are often ſynonymouſly uſed in the goſpel-hiſtory, but ſometimes the apoſtles are diſtinguiſhed from diſciples as perſons ſelected out of the number of diſciples, to be the principal miniſters of his religion; of theſe there were only twelve. The Latins kept the feſtival of the ſeventy or ſeventy-two diſciples on July 15, and the Greeks on January 4.

DISCIPLINE, in a general ſenſe, denotes inſtruction and government, as military diſcipline, eccleſiaſtical diſcipline, *&c.*

Eccleſiaſtical diſcipline conſiſts in putting thoſe laws in execution by which the church is governed, and inflicting the penalties enjoined by them againſt the ſeveral ſorts of offenders that profeſs the religion of Jeſus: the primitive church never pretended to exerciſe diſcipline upon any but ſuch as were within her pale, in the largeſt ſenſe, by ſome act of their own profeſſion; and even upon theſe ſhe never pretended to exerciſe her diſcipline ſo far as to cancel or diſannul their baptiſm: all that ſhe pretended to, was to deprive men of the benefits of external communion, ſuch as public prayer, receiving the euchariſt, and other acts of divine worſhip. The church diſcipline was only confined to the admonition of the party, and to the leſſer and greater excommunication.

As to the objects of eccleſiaſtical diſcipline, they were all ſuch delinquents as fell into great and ſcandalous crimes after baptiſm.

Diſcipline, in a more peculiar ſenſe, is uſed for the chaſtiſements, or bodily puniſhments inflicted, on a religious of the romiſh church who has been found a delinquent; or, even for that which the religious voluntarily undergo or inflict on themſelves, by way of mortification.

DISCLAIMER, in law, is a plea wherein is contained an expreſs denial of a thing; as where upon the diſtreſs of a lord, a tenant ſhews a replevin, and the lord avows the taking, by alledging the tenant holds of him as of his lord, and that he diſtrained for the rent unpaid, or ſervice not performed: in this caſe, if the tenant denies that he holds of him, this is called a diſclaimer; and on that account, if the lord proves the tenant to hold of him, the tenant, on a writ of right, ſhall loſe his land. There is likewiſe a diſclaimer of goods, as when a perſon arraigned of felony, diſclaims the goods charged on him, though he ſhould be acquitted, he loſes the goods. When a defendant in his anſwer in chancery, denies his having any intereſt in the thing in queſtion, it is alſo a diſclaimer; and to theſe may be added a diſclaimer or renouncing an executorſhip of a will, or the right to an adminiſtration.

DISCONTINUANCE, in law, ſignifies an interruption or ceſſation of the courſe of a thing, and is of two kinds. 1. Diſcontinuance of eſtate or poſſeſſion, which has this effect, that a perſon may not enter upon his own land, &c. aliened, whatever his right be to it, of his own authority, but muſt bring his writ, and ſeek to recover poſſeſſion by law. A diſcontinuance may be by feoffment, fine, recovery, leaſe, and confirmation with warranty; but grants of land without livery, or if made in fee without any warranty, are not diſcontinuances. 2. Diſcontinuance of proceſs, where the opportunity to proſecute a ſuit is loſt, or the plaintiff is put *ſine die*, and diſmiſſed the court. After a verdict in a cauſe, no diſcontinuance is allowed without leave of the court, and coſts are uſually given the defendant on diſcontinuing ſuits. As diſcontinuance of proceſs is helped by appearance at common law, ſo all diſcontinuances and miſcontinuances of the plaintiff, or defendant, are cured after verdict by ſtatute.

DISCONTINUANCE *of plea*, is when divers things ſhould be pleaded to in a ſuit or action, and ſome thereof are omitted in the pleading. Where a defendant's plea anſwers to part only, it is a diſcontinuance as to the part not anſwered, and the plaintiff may take judgment by *nil dicit* for that. But if the plaintiff pleads over thereto, the whole action is diſcontinued.

DISCORD, in muſic, the relation of two ſounds which are always and of themſelves diſagreeable, whether applied in ſucceſſion or conſonance. Thus the ſecond, fourth, and ſeventh, with their octaves, and, in general, all intervals, except thoſe few which preciſely terminate the concords, are called diſcords. Diſcords are diſtinguiſhed into concinnous and inconcinnous intervals. See the article INTERVAL.

Concinnous DISCORDS, called by the antients emmeli, are ſuch as are fit for muſic, next to and in combination with concords. Theſe are relations which in themſelves are neither very agreeable nor diſagreeable, and have only a good effect in muſic, as by their mixture and combination with the more natural and eſſential principles, they produce a variety neceſſary to our being better pleaſed.

Inconcinnous DISCORDS, by the antients called ecmeli, are ſuch as are never choſen in muſic, as having too great a harſhneſs in them, though even the greateſt diſcord is not without its uſe. The eſſential principles of harmony, harmonical intervals, or concords, are in number only eight: the indefinite numbers of other ratios are all diſcords. Hence Mr. Malcolm ſhews the neceſſity of taking ſome of the leſs untoward of theſe diſcords into the ſyſtem of muſic. In order to this, he conſiders the effect of having none but harmonical intervals in the ſyſtem of muſic. 1. With reſpect to a ſingle voice. If that ſhould move always from one degree to another, ſo as every note or ſound to the next were in the ratio of ſome concord, not only the variety, which is the life of muſic, would be ſoon exhauſted, but the very perfection of ſuch relation of ſounds would clog the ear, in the ſame manner as ſweet and luſcious things do the taſte. 2. With reſpect to muſic in parts, that is, where two or more voices join in conſonance, the general rule is, that the ſucceſſive ſounds of each be ſo ordered, that the ſeveral voices ſhall be all concords. Now there ought to be a variety in the choice of thoſe ſucceſſive concords, and alſo in the method of their ſucceſſion; all which depends on the movement of the ſingle parts. So that if theſe could only move in an agreeable manner by harmonical diſtances, there are but few different ways wherein they could move from concord to concord, and hereby we ſhould loſe much of the raviſhment of ſounds in conſonance. A variety, therefore, is requiſite, by which each ſingle voice, or more in conſonance, may move agreeably in the ſucceſſive ſounds, ſo as to paſs from concord to concord, and meet at every note in the ſame or a different concord, from what they ſtood in at the laſt note. From theſe two conſiderations, it appears how imperfect muſic would be without any other intervals than concords; but in what caſes, and for what reaſons diſcords are allowed, the rules of compoſition muſt teach. See HARMONY.

Beſides the concinnous diſcords uſed deſignedly in muſic, there are ſeveral other diſcord relations which happen unavoidably in an accidental and indirect manner. Thus in the ſucceſſion of ſeveral notes, there are to be conſidered not only the relations of thoſe which ſucceed others immediately, but alſo of thoſe, betwixt which others intervene. Now the immediate ſucceſſion may be conducted ſo as to produce melody; and yet among the diſtant notes there may be very groſs diſcords, that would not be tolerable in mediate ſucceſſion, and far leſs in conſonance. Thus taking any one ſpecies, for example, that with the greater third, and marking the degrees between each term and the next, though the progreſſion be melodious, as the terms refer to one common fundamental, yet there are ſeveral diſcords among the mutual relations of the terms, *e. g.* from the fourth to the ſeventh greater is 32 : 45, and from the ſecond greater to the ſix greater is 27 : 40, and from the ſecond greater to the fourth is 27 : 32, all diſcords.

Diſcords may tranſiently paſs upon the unaccented part of a meaſure, without great offence to the ear. This is called ſuppoſition. See SUPPOSITION.

The harmony of diſcords, is that wherein the diſcords are made uſe of as the ſolid and ſubſtantial part of the harmony. For by a proper interpoſition of a diſcord, the ſucceeding concords receive an additional grace. Thus the diſcords are in muſic, what ſtrong ſhades are in painting. See the article HARMONY.

The diſcords are the fifth when joined with the ſixth, the fourth with the fifth. The ninth of its own nature is a diſcord; ſo is the ſeventh. The diſcords are introduced into harmony with due preparations, and muſt be ſucceeded by concords, which is the reſolution of diſcords. The diſcord is prepared by ſubſtituting it firſt in the harmony, in quality of a concord; that is, the ſame note which becomes a diſcord, is firſt a concord to the baſe note immediately preceding that to which it is a diſcord. Again, a diſcord is reſolved by being immediately ſucceeded by a concord, deſcending from it only by the diſtance of a greater or leſſer ſecond.

DISCOVERY, in dramatic poetry, a manner of unravelling a plot, or fable, in tragedies, comedies, and romances, wherein, by ſome unforeſeen accident, a diſcovery is made of the name, fortune, quality, &c. of a principal perſon, which were before unknown. See CATASTROPHE. A diſcovery ought never to be in vain, by leaving thoſe who remember one another in the ſame ſentiments they were in before: it muſt produce either love or hatred in the principal, not inferior characters.

Thoſe diſcoveries which are immediately followed by a change of fortune, are the moſt beautiful, as they never fail to produce terror or pity, which is the end and aim of tragedy. Thus, OEdipus in Sophocles, from his diſcovery of being the ſon of Jocaſta and Laius, immediately from the moſt happy becomes the moſt miſerable of mortals. See PERIPETIA.

There are ſeveral ſorts of diſcoveries: the firſt, by certain marks of the body, either natural or accidental, as that of Ulyſſes, who having received a wound in the thigh by a boar before the trojan war, is diſcovered by the old nurſe, upon waſhing his legs, after his return home incognito. The ſecond is by tokens, and is often uſed by Terence. The third is by remembrance. Thus when Ulyſſes heard Demodocus ſing his actions at Troy, the memory of them drew tears from his eyes, and diſcovered him to Alcinous. The fourth ſort is made by reaſoning; but the fineſt of all is that which ariſes from the ſubject or incidents of the fable; as that of OEdipus, from his exceſſive curioſity, and the letter that Iphigenia ſent by Pylades.

DISCOUNT, in commerce, a term among traders, merchants, aud bankers. It is uſed by the two former on occaſion of their buying commodities on the uſual time of credit, with a condition that the ſeller ſhall allow the buyer a certain diſcount at the rate of ſo much *per cent. per annum*, for the time for which the credit is generally given, upon condition that the buyer pays ready money for ſuch commodities, inſtead of taking the time of credit. Traders and merchants alſo frequently taking promiſſory notes for monies due, payable to them or order at a certain time; and ſometimes having occaſion for money before the time is elapſed, procure theſe notes to be diſcounted by bankers before the time of payment; which diſcount is more or leſs according to the credit and reputation of the perſon who drew the note, and the indorſer or indorſers. Bills of exchange are alſo diſcounted by bankers, and in this conſiſts one article of the profits of banking. See the article BANK.

The ſieur de la Porte informs us, that they make a diſtinction in France with regard to money due for the purchaſe and ſale of commodities, and on account of raiſing money by diſcounting bills of exchange; the latter being computed upon the principles of common intereſt by ſo much on the 100 l. whereas that on commodities is not only laid on the 100 l. but on the hundred and diſcount added together.

The beſt tables of diſcount in our language, are thoſe of Mr. Smart, founded upon the true principles of decimal arithmetic. By theſe it appears, that he who allows 5 l. for the diſcount of 100 l. for one year at 5 l. *per cent.* wrongs himſelf; for he ought to receive ſo much money as at 5 *per cent.* intereſt will amount to 100 l. in one year, and the ſum is 95 l. 4 s. 9 $\frac{1}{4}$ d.

DISCOURSE, *diſcurſus*, among logicians, ſignifies the progreſſive exerciſe of reaſon in the ſearch of truth; as when from ſelf-evident principles it diſcovers the truth of ſomething it did not know before; by means of this, a ſecond; by that ſecond, a third; and ſo on. See the article REASONING.

DISCOUS FLOWERS, thoſe furniſhed with a diſc. See the article DISC.

DISCRETE, or **DISJUNCT PROPORTION**, is when the ratio of two or more pairs of numbers or quantities is the ſame, but there is not the ſame proportion between all the four numbers. Thus if the numbers 3 : 6 : : 8 : 16 be conſidered, the ratio between 3 : 6, is the ſame as that between 8 : 16, and therefore the numbers are proportional; but it is only diſcretely or disjunctly, for 3 is not to 6 as 6 to 8; that is, the proportion is broken off between 8 and 3, and is not continued as in the following continual proportionals, 3 : 6 : : 12 : 24. See PROPORTION.

DISCRETE QUANTITY, ſuch as is not continuous and joined together. Such is a number whoſe parts being diſtinct units, cannot be united into one continuum; for in a continuum, there are no actual determinate parts before diviſion, but they are potentially infinite.

DISCRETIVE PROPOSITIONS, are thoſe where various judgments are made and denoted by the particles *but*, *notwithſtanding*, &c. either expreſſed or underſtood. Thus, *fortune may deprive me of my wealth*, *but not of my virtue*, is a diſcretive propoſition.

DISCUS, in antiquity, an inſtrument uſed by the antients in their public games. It is certain it was uſed in the gymnaſtic art for preſerving health and ſtrengthning the conſtitution; but as to its form, its dimenſions, and various uſes, authors diſagree. See the article DISC.

The ſame exerciſe was performed with an inſtrument called σολος, which ſome diſtinguiſh from the diſcus, becauſe that was made of iron, and the diſcus of ſtone; while others diſtinguiſh them by the form, the σολος being ſpherical, and the diſcus broad.

DISCUSSION, in matters of literature, ſignifies the clear treating or handling of any particular point, or problem, ſo as to ſhake off the difficulties with which it is embarraſſed: thus we ſay, ſuch a point was well diſcuſſed, when it was well treated of, and cleared up.

DISCUSSION, in a medicinal ſenſe, the ſame with diaphoreſis. See DIAPHORESIS.

DISCUTIENTS, in medicine, are ſuch remedies as, by their ſubtilty, diſſolve a ſtagnating or coagulated fluid, and diſſipate the ſame without an external ſolution of continuity.

Diſcutient compoſitions conſiſt of emollients and attenuants; in which intention mercury, cinnabar, opium, and camphor are greatly recommended. Diſcutients ought to be carefully diſtinguiſhed from ſuppuratives. See DISPERSION *of Inflammations*.

DISDIAPASON, or **BISDIAPASON**, in muſic, a compound concord, deſcribed by F. Parran, in the quadruple ratio of 4 : 1, or 8 : 2.

The diſdiapaſon is produced when the voice goes diatonically from its firſt to its fifteenth ſound, and may be called a fifteenth. The voice ordinarily does not go farther than from its firſt ſound to the diſdiapaſon; *i. e.* it does not go beyond the compound, or double octave; for the diſdiapaſon is an octave doubled. The voice ſometimes riſes ſeveral degrees above the diſdiapaſon, but the effort or ſtruggle disfigures it, and makes it falſe. In reality, the antient ſcale or diagram extended only to a diſdiapaſon.

DISDIAPASON-DIAPENTE, a concord in a ſextuple ratio of 1 : 6.

DISDIAPASON-SEMI-DIAPENTE, a compound concord in the proportion of 16 : 3.

DISDIAPASON-DITONE, a compound conſonance in the proportion of 10 : 2.

DISDIAPASON-SEMI-DITONE, a compound concord in the proportion of 24 : 5.

DISEASE, in medicine, the ſtate of a living body, wherein it is deprived of the exerciſe of any of its functions, whether vital, natural, or animal.

Some authors have given us compendious theories of diſeaſes: Bontekoe deduces all human diſeaſes from the ſcorbutus: Muſgrave, from the arthritis; Dr. Woodward, from the bile; ſome from the venereal virus, which has lurked in the ſeed ever ſince the ſin of Adam; ſome from extraneous ferments, formed in or out of us; and ſome from worms.

As the actions or conditions of the body, ſo alſo the diſeaſes or defects thereof may be reduced to three general heads, *viz.* thoſe of the ſolids, thoſe of the fluids, and thoſe compounded of both.

The ſolids, *i. e.* the bones and fleſh, may be diſordered five ways, *viz.* rendered turgid by tumours, cut by wounds, corroded by ulcers, *&c.* removed out of their places, or diſcontinued by fractions and contuſions.

Diſeaſes of the fluids are in the blood or ſpirits. Thoſe of the blood are two, ſuch as thicken and retard its motion, or ſuch as attenuate and accelerate it. To the laſt kind, the fever and feveriſh affections only belong: all other diſeaſes of the blood belong to the former.

The diſeaſes of the animal ſpirits ariſe either from an intermiſſion or retardation of their motion; or a diminution of their quantity; or diſorder in their quality. Laſtly, diſeaſes of the fluids, whether thoſe of the blood or ſpirits, are ſeldom long confined thereto, but preſently come to diſturb and impede ſome of the functions of the ſolid parts, and at laſt corrupt the ſubſtance of the ſolids themſelves: hence ariſe compound or complicated diſeaſes, which are infinitely various. The learned Boerhaave furniſhes us with an accurate and ſcientifical diviſion of diſeaſes into thoſe of the ſolids and fluids, to which we refer the reader.

All diſeaſes are owing to the bad regulation of our lives, either from too much or too little ſleep, too much or too little exerciſe, *&c.* Sometimes they are cauſed by things without, and very often by an abuſe of food; that is, by our intemperance in eating and drinking, which is ſo much the more injurious to us, becauſe it affects us inwardly. See REGIMEN.

Mr. Hacquet rejects the ſyſtem of the materialiſts, who conſidered all diſeaſes as *entia nova*, or new productions, and endeavours to account for all new modifications on a deſtruction of proportions, or a change in the ſtructure of parts: he ſuppoſes the preſſure, ſtructure, and convulſion of the nerves affecting the fluids, to be the principal cauſe of diſtempers; and undertakes to prove, that the firſt operation of poiſons and infections is on the ſpirits, and from them communicated to the blood.

To attain a complete hiſtory of diſeaſes, ſuch enquiries are to be made, and circumſtances known, which ſhow the genius and ſtate of the diſeaſe; and the operations and effects of the medicines are to be carefully obſerved. A particular regard muſt be had to the ſymptoms which differ ſtrangely in all different ſubjects, on account of the various conſtitutions of different bodies. It will therefore be neceſſary to enquire into the age, ſex, ſtructure, and habit of the body; or the acquired habit and ſtrength of the patient; and whether he has an hereditary diſpoſition to this or that diſeaſe. From the different conſtitution of the parts, ariſe the different ſtate and mechaniſm of the ſolids and fluids, and a proneneſs to certain diſeaſes; as alſo, the variety of manners and inclinations. In childhood, there is a remarkable ſoftneſs of the fibres, a lax and thin habit, with an abundance of ſerum; young perſons have tenſe and contractile fibres, with more hot blood, which is more apt for motion: thoſe that are old have a great rigidity of the ſolids, and a ſtraitneſs of the paſſages, veſſels, and canals, with a ſalſo-ſulphureous dyſcraſy of the humours. Likewiſe, regard muſt be had to the female ſex, for they are not only obnoxious to diſtinct diſeaſes, which ariſe from diſorders of the menſes and child-bearing, but the ſyſtem of their nerves is likewiſe more weak; whence they are more liable to ſpaſtic and convulſive diſorders, and are more eaſily reſtored to health than men. See MENSES, PREGNANCY, &c. It is likewiſe proper to know whether the patient be of a lax or tenſe habit of body, whether the veſſels are ſlender and numerous, or large and few; becauſe in narrow and ſlender canals, the progreſſive motion of the fluids is more difficult, as well as the ſecretions and excretions: for theſe are more quick and ready when the fibres are tenſe, and the veſſels pretty large. Whence we may obſerve, that they are more liable to diſorders, and grow well with greater difficulty, whoſe fibres are more ſtrong, and whoſe circulation of the fluids is more quick. The ſame may be ſaid of lean and fat perſons. Regard muſt alſo be had to the colour of the face and ſkin. A fair, florid, and clear complexion, ſhow the purity of the lymphatic fluids; if it be livid, lurid, and yellow, they diſcover a ſalino-ſulphureous impurity of the ſame, and a diſordered ſecretion in the proper organs, eſpecially in the liver. It appears from daily obſervation, that the debility, defects, and faults of the viſcera and fibres, as well as diſeaſes proceeding from thence, often deſcend to children; and the practitioner ſhould be informed hereof: for hereditary imbecilities and weakneſſes are more difficult to be cured, more readily return, and tire the phyſician's patience. It is likewiſe neceſſary to know the ſtrength; whether the patient's ſpirits are low, eſpecially in the beginning of an acute diſeaſe, for weakneſſes and lowneſſes are then bad ſigns: but if the perſon is in ſtrength and vigour, which appear from the motion and impulſe of the fluids, there are great hopes of recovering health.

We are not only to examine the condition of the body, but the ſtate of the mind, and what diſorders it is liable to, becauſe there is a wonderful connection between the mind and the body. For a greater tenſity and mobility of the fibres and ſolids, diſpoſe the mind to anger; whereas a laxity and defect of the vis motrix, ſhows the perſon to be diſpirited, timid, and fearful. On the other hand, anger increaſes the tone and contractions of the ſolids, and renders the fluids more impetuous; but timidity diſſolves and dejects the ſtrength, whence the circulation of the fluids is more ſlow. Terror greatly conſtringes the ſurface and extreme parts of the body, and drives the blood to the interior and noble parts; that is, the præcordia and head; whence proceed grievous diſorders, eſpecially of the genus nervoſum. The ſame may be ſaid of ſadneſs, which often proceeds from a defect of the viſcera, and a faulty circulation of the fluids, as in the hypochondriac paſſion: but when its hurtful influence attacks the ſolid parts, it wonderfully dejects the ſtrength of the whole body, and hurts its functions, relaxing and leſſening the ſtrength of the fibres.

If the mind is not compoſed, and at eaſe, but ſubject to various paſſions and commotions, diſeaſes are cured with greater difficulty; therefore, enquiry is to be made whether the patient is not addicted to hard ſtudy, and to profound and fatiguing meditation: for it can hardly be imagined what a conſent there is between the brain and its membranes, as well as between the ſtomach and the adjoining inteſtines. See CONSENT *of parts*.

Beſides, it is neceſſary to conſider the place where the patient lives, the nature of the air, and his uſual diet. See the articles AIR and DIET.

Enquiry muſt be made into the kind of life: whether it be laborious or unactive, requiring exerciſe or ſedentary; whether the perſon be a courtier or a ſoldier; a ſtudent or a tradeſman; whether he be converſant among metals and minerals, or work at the fire: for every kind of life produceth particular diſeaſes: thus braſiers are ſubject to diſeaſes of the eyes; huſbandmen, to thoſe of the breaſt; makers of ſtarch, to coughs and aſthmas; porters, to aſthmas, ruptures, and burſting of the veſſels in the breaſt; tallow-chandlers, to diſeaſes of the head and ſtomach; workers in tow, hemp, and ſilk, to ſhortneſs of breath; leather dreſſers are generally cachectic and hydropical; runners of races are often troubled with a ſhortneſs of breath, and ſpit blood; carpenters are ſubject to ſore eyes; nightmen are apt to be blind; plaſterers are ſubject to ſhortneſs of breath, and conſumptions; waſherwomen are liable to difficulties of breathing, and dropſies; makers of oil are cachectic and aſthmatic; plumbers are ſubject to palſies; houſe-painters are generally valetudinarians, cachectic, and paralytic; fiſhermen have ulcers in their legs; bakers are ſubject to coughs, hoarſeneſs, and lippitude, as well as a conſtipation of the pores; cutters of tobacco are ſubject to the vertigo; and the like.

Another thing to be examined is the excretions erations, for unleſs theſe are regular, health cannot be maintained; and therefore, if they are too plentiful, or defective and ſuppreſſed, they will cauſe various diſorders. Regard is alſo to be had to perſpiration, which carries off more matter than all emunctories beſides. See EXCRETION and PERSPIRATION.

The practitioner ſhould likewiſe enquire what diſeaſes the patient has been ſubject to, at what time, and how cured; for it often happens in the raſh and imprudent cure of diſeaſes, that terrible and dangerous ſymptoms are produced, and that the driving away one diſeaſe, is productive of a much worſe.

Sometimes diſeaſes are ſtrangely complicated, inſomuch that if the patient was affected with the hypocondriac paſſion, or a cachexy, ſcurvy, debility of the head, ſpitting of blood, conſumption, piles, gravel, or gout, another diſtemper ſupervenes, which requires the utmoſt prudence, and a different method of cure.

It is likewiſe neceſſary to inquire whether the patient is plethoric, or cacochymic; what is the ſtate of the ſtomach, and inteſtines; what is the condition of the liver, whether the circulation through it be impeded; whether the bile be duly ſecreted; what is the ſtate of the lungs; and, laſtly, the temperies of the brain, and nervous ſyſtem, are to be conſidered. Theſe things being mutually conſulted, we muſt proceed to the diſeaſe itſelf, as whether it be common, or epidemic; whether the virulence appears on the ſkin in puſtles, or otherwiſe. As there is no fever or other diſeaſe which has not ſenſible remiſſions and intermiſſions of the ſymptoms, the phyſician ought to know the ſtate of the natural, vital, and animal functions, as well in, as out of the paroxyſm.

In acute diſeaſes, we may know the genius and force of the diſorder, from the reſpiration, nature, and condition of the pulſe; beſides, as no patient dies without an inflammation and internal mortification, and as the inflammation of the ſtomach and membranes are produced eaſily in acute diſeaſes, and in the chronic the mortifications of the viſcera put a period to human life, the phyſician ſhould carefully attend to theſe fatal ſymptoms, in order to manage the diſeaſe with greater certainty.

Likewiſe, the ſtate of the primæ viæ is carefully to be examined, as whether they are replete with ſordes; whether the body is coſtive, or otherwiſe, &c. It is likewiſe neceſſary to obſerve the operations of the medicines, and what changes they produce, whether the force and vehemence of the ſymptoms mitigate or increaſe; or whether nothing of this kind happens. See MEDICINE.

Many diſeaſes, and eſpecially fevers of all kinds, attack the patient all at once, and are attended with particular ſymptoms, requiring ſometimes one kind of management, and ſometimes another: therefore, the cauſes of theſe diſeaſes can be nothing elſe but ſuch as are common to many men, and equally affect them all. The moſt common of which is the unhealthy ſtate of the air: but this alone is not ſufficient for the generation of epidemic diſeaſes; for it is evident from obſervation, that, in the ſame climate, and the ſame conſtitution of the heavens, a diſeaſe ſhall infeſt the inhabitants of one place and not another, as appears from the ſmall-pox, dyſenteries, and miliary fevers: wherefore, recourſe muſt be had to the nature of exhalations from pools and marſhy places, which are replete with ſulphureous, vitriolic, aluminous, bituminous, ſaline, and other particles. Regard muſt likewiſe be had to the different way of living, and kinds of aliments, from whence the cauſes of epidemic diſeaſes differ in their nature, matter, texture, power, and virtue; and affect the ſtructure and motion of the body in a preternatural manner: theſe cauſes and concurrent circumſtances being known, an epidemic diſeaſe may be predicted, and the beſt method of cure adviſed.

The method of diſtinguiſhing the various kinds of diſeaſes, is affixed to our account of theſe diſeaſes, as they occur under their ſeveral names, and is therefore omitted here.

Endemic DISEASES. See the article ENDEMIC DISEASES.

Epidemic DISEASES. See the article EPIDEMIC DISEASES.

DISEASES *of infants.* See the article *Diſeaſes of* INFANTS.

DISEASES *of plants*, generally proceed from aqueous, bituminous, or ſaline parts. Sometimes the diſeaſe is eſſential, proceeding from ſome ſecret imperfection in the ſeed; ſometimes only accidental by ſome outward violence. The ſeveral ſeaſons of the year are the cauſes of injurious accidents to trees; the winter by extraordinary colds; the ſpring by piercing miſts, rawneſs of the air, and hurtful dews; the ſummer by too great droughts and exceſſive heat; and the autumn by too great a degree of moiſture. Diſeaſes may alſo happen to the ſeed, before it is put into the earth. Mr. Tournefort has an expreſs diſſertation on this ſubject in the *Memoires de l'Academie des Sciences*, referring all the diſeaſes of plants, 1. Either to too great abundance of nutritious juice. 2. The want or defect of this juice. 3. Some ill qualities it acquires. 4. Its unequal diſtribution in difficult parts of the plants, or, 5. external accidents.

The moſt common diſeaſes belonging to trees are barrenneſs, blaſting of the buds, conſumption, moſs, jaundice, mildew, cauſed by a thick fog, falling of the leaves, ſcorching, the worm, not thriving, *&c.*

DISEMBOGUE, in the ſea-language, is ſaid of a ſhip that paſſes out of a gulph or bay into the open ſea: a river is alſo ſaid to diſembogue or diſcharge itſelf into the ſea.

DISFRANCHISING, among civilians, ſignifies the depriving a perſon of the rights and privileges of a free citizen or ſubject. See the article FRANCHISE.

DISGUISE, a counterfeit habit. Perſons doing unlawful acts in diſguiſe, are by our ſtatutes ſometimes ſubjected to great penalties, and even declared felons. Thus by an act, commonly called the black act, perſons appearing diſguiſed and armed in a foreſt, or grounds incloſed, or hunting deer, or robbing a warren or a fiſh-pond, are declared felons.

DISH, among miners, denotes a wooden meaſure, wherein they are obliged to meaſure their ore: it is kept by the barmaſter, and contains about 672 ſolid inches. See the article ORE.

DISJUNCT PROPORTION, the ſame with that otherwiſe called diſcrete. See the article DISCRETE.

DISJUNCTIVE, ſomething that ſeparates or disjoins. Thus, *or*, *neither*, &c. which in connecting a diſcourſe yet ſeparates the parts of it, are called disjunctive conjunctions.

DISJUNCTIVE PROPOSITION, in logic, is that where of ſeveral predicates we affirm one neceſſarily to belong to the ſubject to the excluſion of all the reſt, but leave that particular one undetermined. Such is the major of the following disjunctive ſyllogiſm.

The world is either ſelf-exiſtent, or the work of ſome finite, or of ſome infinite being.

But it is not ſelf-exiſtent, nor the work of a finite being.

Therefore it is the work of an infinite being.

DISK, or DISC. See the article DISC.

DISLOCATION, in ſurgery, the ſame with luxation. See LUXATION.

DISMEMBERED, in heraldry, is applied to birds that have neither feet nor legs, and alſo to lions and other animals whoſe members are ſeparated.

DISMOUNTING, in the military art, the act of unhorſing. Thus to diſmount the cavalry, dragoons, *&c.* is to make them alight.

Diſmounting cannon, is the breaking their carriages, wheels, axletrees, or any thing elſe, ſo as to render them unfit for ſervice.

DISORIENTATED, a term chiefly uſed in ſpeaking of dials, which have been ſome how altered from the ſituation of directly facing the eaſt or any other of the cardinal points. See the articles DIAL and DIALLING.

DISPARAGEMENT, in our law, is properly uſed for the matching an heir in marriage under his degree, or againſt decency.

DISPART, in gunnery, is the ſetting a mark upon the muzzle ring, or thereabouts, of a piece of ordnance, ſo that a ſight-line taken upon the top of the baſe-ring againſt the touch-hole, by the mark ſet on or near the muzzle, may be parallel to the axis of the concave cylinder. The common way of doing this, is to take the two diameters of the baſe-ring, and of the place where the diſpart is to ſtand, and divide the difference between them into two equal parts, one of which will be the length of the diſpart which is ſet on the gun with wax or pitch, or faſtened there with a piece of twine or marlin. By means of an inſtrument it may be done with all poſſible nicety.

DISPATCH, a letter ſent abroad by a courier on ſome affair of ſtate, or other matter of importance. The buſineſs of diſpatches lies upon the miniſters of ſtate and their clerks.

This word alſo ſignifies the packet or mail containing ſuch letters.

DISPAUPER. A perſon ſuing in forma pauperis, is ſaid to be diſpaupered if, before the ſuit is ended, he has any lands or other eſtate fallen to him, or if he does any thing to make him loſe his privilege. See the article FORMA PAUPERIS.

DISPENSARY, or DISPENSATORY, denotes a book containing the method of preparing the various kinds of medicines uſed in pharmacy. Such are thoſe of Bauderon, Quercetan, Zwelfer, Charas, Bates, Meſue, Salmon, Lemery, Quincy, *&c.* but the lateſt and moſt eſteemed are the Edinburgh and London Diſpenſatories. In compiling this laſt, the chief care of the college of phyſicians was to expunge the medicines no longer made uſe of in general practice, and to inſert ſuch as have come lately into eſteem; and alſo to examine the articles they have retained or given admiſſion to, both in regard to their pharmaceutic compoſition, and upon the genuine principles of medicine. The apothecaries in and about London are obliged to make up their compound medicines according to the formulas preſcribed in the college diſpenſary, and are enjoined to keep always ready in their ſhops all the medicines there enumerated.

DISPENSARY, or DISPENSATORY, is likewiſe a magazine or office for ſelling medicines at prime coſt to the poor. The college of phyſicians maintain three of theſe in London, one at the college itſelf in Warwick-lane; another in St. Peter's alley, Cornhill; and a third in St. Martin's-lane.

DISPENSATION, in law, the granting a licence of doing ſome certain action that otherwiſe is not permitted.

The greateſt dealer in diſpenſations is the pope, who claims the office *jure divino*, and extends it to every thing. The more moderate of the romaniſts themſelves deny that he can give a diſpenſation for any thing contrary to the divine law, or the law of nature; and confine him to what is contrary to poſitive laws, or to things relating to faſts, marriages, holding ſeveral benefices, *&c.* and they limit him even in theſe things.

The archbiſhop of Canterbury has a power, by ſtatute, of diſpenſing in any cauſe wherein diſpenſations were formerly granted by the ſee of Rome; and as well to the king as his ſubjects; and during the vacancy of the archbiſhop's ſee, the guardian of the ſpiritualities may grant diſpenſations. Every biſhop of common right has the power of inſtituting into benefices, and of diſpenſing in common caſes, *&c.* A diſpenſation of the king, makes a thing prohibited lawful to be done by the perſon that has it, though a thing evil in itſelf will not admit of a diſpenſation. And where the ſubject has an immediate intereſt in an act of parliament, the king cannot diſpenſe with it; but may, if the ſuit be the king's own only, for the breach of a penal law that is not to the damage of a third perſon.

There is a diſpenſation by *non obſtante*, which is where a ſtatute tends to reſtrain ſome prerogative incident to the perſon of the king, as the right of pardoning, or commanding the ſervice of the ſubjects for the benefit of the public, *&c.* each of which prerogatives are inſeparable from the king, and therefore, by a clauſe *non obſtante*, ſuch a ſtatute may be diſpenſed with. See the article NON OBSTANTE.

DISPENSATORY, or DISPENSARY. See the article DISPENSARY.

DISPERSION, in optics, the ſame with the divergency of the rays of light.

Point of DISPERSION, in dioptrics, the point from which refracted rays begin to diverge, where their refraction renders them divergent. See REFRACTION.

DISPERSION *of Inflammations*, in medicine and ſurgery, is the removing the inflammation, and reſtoring the inflamed part to its natural ſtate.

Though the methods uſed to cure inflammations be various, according to the ſeveral cauſes and ſupervening ſymptoms, with other various circumſtances, yet as the inflammation conſtantly ariſes from an inſpiſſation of the blood in its ſmalleſt veſſels, the grand intention of each of theſe methods ſhould be, to open ſuch ſmall veſſels as are thus obſtructed, and to reſtore the blood to its natural conſiſtence and free circulation.

If the cauſe of the inflammation is found to be external, and obvious to the ſenſes, as thorns, ſplinters, the point of a ſword, bullets, or any other foreign body ſtuck into the part, nothing can be more ſerviceable than ſpeedily and carefully to remove whatever is lodged there, if it can be done with ſafety. So alſo, when the inflammation proceeds from too ſtrait a bandage in wounds, *&c.* or from a luxation or fracture, the firſt and principal buſineſs is ſpeedily to remove the bandage, or elſe ſet the fracture, or reduce the luxation.

When the external cauſes are once removed, and when the inflammation is great, and proceeds from internal cauſes, it is in both caſes very uſeful to open a vein, either in the arm or foot, and to draw off a large quantity of blood proportionable to the ſtrength and habit of the patient; giving afterwards a briſk purge, not one that heats the body, but judiciouſly accommodated to the age and conſtitution of the patient; and if the ſymptoms do not remit and grow milder, they muſt be repeated at diſcretion.

To reſolve and attenuate the inſpiſſated blood in the ſmall veſſels, benefit may ariſe from internal medicines, which are watry, diluent, cooling, and attenuating; but aliments which are of a difficult digeſtion, ſuch as pickled or ſalted meats, with all ſpices and fermented liquors, or any thing elſe that may heat the blood, are to be altogether avoided. With regard to the regimen and diet, the moſt proper aliment ſeems to be broths and drinks, made with barley, oats, or flour; alſo viper's graſs, ſuccory, chervil, ſorrel, endive, apples, and vegetables of the like nature.

With regard to external medicines, it muſt be generally obſerved never to apply hot remedies to hot conſtitutions, nor the contrary. Among the domeſtic medicines cow's dung, freſh and warm, mixt with warm vinegar, is an application of no ſmall efficacy: the external medicines ſhould always be applied hot, and the diſordered limb firſt well rubbed with a cloth dipped in ſome warm diſcutient fomentation, before any freſh cataplaſm be laid on. Of the cooling external medicines proper in this caſe, are the litharge vinegar, applied warm on linen rags folded together; or hot vinegar mixt with red-lead, or with bole-armoniac, and applied in the ſame manner. Among the hot remedies for cold conſtitutions, are ſpirit of wine alone, or camphorated ſpirit; or either of theſe, with an admixture of a ſmall quantity of venice-treacle applied on a linen cloth; alſo ſpirit of wine mixed with lime water, or even lime-water alone; or hungary-water with lapis calaminaris, cerus, ſal armoniac; or a mixture of a pint of rectified ſpirit of wine with two ounces of caſtile ſoap.

DISPLAYED, in heraldry, is underſtood of the poſition of an eagle, or any other bird, when it is erect, with its wings expanded or ſpread forth. See plate LXXIII. fig. 5.

DISPONDEE, *diſpondæus*, in the greek and latin poetry, a double ſpondee or foot, conſiſting of four long ſylables, as θᾱυμᾱζο̄ντω̄ν, māēcēnātēs, cōnclūdēntēs.

DISPOSITION, in architecture, the juſt placing the ſeveral parts of an edifice, according to their proper nature and office. See the article BUILDING.

DISPOSITION, in rhetoric, the placing words in ſuch an order as contributes moſt to the beauty and ſometimes even to the ſtrength of a diſcourſe.

Nature formed man with a taſte which makes him ſenſible of harmony and cadence; for this we need only conſult nature, ſtudy the genius of the language and ſound, and, as it were, interrogate our ears: for let a thought be ever ſo beautiful in itſelf, if the words which expreſs it are ill placed, the delicacy of the ear is ſhocked at it; a harſh and unharmonious compoſition grates it, whereas it is generally flattered with that which is ſoft and flowing. There are no expreſſions, however harſh they may appear in themſelves, but may contribute to the harmony of a diſcourſe, when judiciouſly ranged. Iſocrates was the firſt among the Greeks that made them ſenſible of the beauty of diſpoſition, as Cicero did the Romans.

DISPROPORTION, a general term for any kind of irregularity, or want of proportion in the parts of a thing. See the article PROPORTION.

DISPUTATION, in the ſchools, a conteſt, either by word or writing, on ſome point of learning for a degree, prize, or for an exerciſe. See DEGREE and THESIS.

DISQUISITION, a ſerious and exact examination into the circumſtances of any affair, in order to diſcourſe clearly about it. See the article REASONING.

DISS, a market-town of Norfolk, on the river Waveney, ſixteen miles ſouth of Norwich.

DISSECTION, in anatomy, the cutting up a body, with a view of examining the ſtructure and uſe of the parts. See the article ANATOMY.

Le Gendre obſerves, that the diſſection of a human body, even dead, was held a ſacrilege till the time of Francis I. and the ſame author aſſures us, he has ſeen a conſultation held by the divines of Salamanca, at the requeſt of Charles V. to ſettle the queſtion whether or no it were lawful in point of conſcience to diſſect a human body in order to learn the ſtructure thereof.

It is eaſily perceived that ſurgery and phyſic muſt improve in a country, according to the opportunities of enquiring into the ſtructure of the animal oeconomy; for which reaſon we could wiſh that ſtudents in anatomy were furniſhed with ſubjects for diſſection in this country, in as great abundance, and with as little inconvenience, as in France.

DISSEISIN, in law, an unlawful diſpoſſeſſing a perſon of his lands or tenements. It is of two ſorts, either ſingle diſſeiſin, which is committed without force of arms, or diſſeiſin by force of arms, more properly termed deforcement. See the article DEFORCEMENT.

The diſturbing a perſon from entring on his land, or hindring him from tilling it, are both diſſeiſins of land; and denial of rent, when lawfully demanded, is a diſſeiſin of the rent.

If a diſſeiſor, after he has expelled the right owner, gains peaceable poſſeſſion of the lands five years without claim, and continues in poſſeſſion ſo as to die ſeiſed, and the land deſcends to his heirs, they will have a right to the poſſeſſion till the owner recovers at law; and here the owner ſhall loſe his eſtate for ever, if he do not proſecute his ſuit within the time limited by the ſtatute of limitations.

DISSEISOR, a perſon who is guilty of diſſeiſin. See the preceding article.

DISSENTERS, ſeparatiſts from the ſervice and worſhip of the church of England.

At the revolution a law was enacted, that the ſtatutes of queen Elizabeth and king James I. concerning the diſcipline of the church, ſhould not extend to the proteſtant diſſenters. Perſons diſſenting, however, are to ſubſcribe the declaration of 30 Car. II. cap. 1. and take the oaths of fidelity, &c. Beſides, they are not to hold their meetings till their place of worſhip is certified to the biſhop, or to the juſtices of the quarter ſeſſions, and regiſtered. Alſo they are not to keep the doors of their meeting-houſes locked during the time of divine ſervice. And to ſecure to them the free exerciſe of their religion, whoever diſturbs or moleſts them in the performance of divine worſhip, on conviction at the ſeſſions is to forfeit twenty pounds by the ſtatute 1 William and Mary. Unleſs diſſenters conform and receive the ſacrament as adminiſtered by the church of England, they are excluded from holding any public places under the government.

The diſſenters tolerated by law, may be reduced to four claſſes, *viz.* preſbyterians, independants, anabaptiſts, and quakers; to which may be added another ſect, which ſome years ago obtained a toleration in this country, namely, the unitas fratrum, or moravians. See the articles PRESBYTERIANS, ANABAPTISTS, &c.

DISSIMULAR, in general, an appellation given to things which are unlike: thus the ſeminal or firſt leaves of plants, are called diſſimular, as being generally of a different figure from thoſe of the grown plants.

DISSIMULAR PARTS, in anatomy, thoſe compounded of parts of various ſtructure, ſuch are all the limbs of the body.

DISSIMILITUDE, in general, denotes whatever conſtitutes the difference between two diſſimular things. See the articles DISSIMULAR and SIMILITUDE.

DISSIMILITUDE, in rhetoric, an argument wherein from diſſimilar or unlike things, other diſſimilars are deduced, as in the following argument from Catullus.

Soles occidere & redire poſſunt.
Nobis cum ſemel occidit brevis lux,
Nox eſt perpetua una dormienda.
Voſs. de inſtitut. orator.

DISSIPATION, in phyſics, an inſenſible loſs or conſumption of the minute parts of the body; or, that flux whereby they fly off, and are loſt. See EFFLUVIUM.

Circle of **DISSIPATION**, in optics, is uſed for that circular ſpace upon the retina, which is taken up by one of the extreme pencils or rays iſſuing from an object.

To underſtand this, it is to be obſerved, that when the diſtance of an object from the eye is too ſmall or too great for perfect or diſtinct viſion, the rays of each pencil, iſſuing from the object, cannot be united at a point on the retina, but beyond it, or before they arrive at the retina; conſequently, the rays of each pencil will occupy a circular ſpace upon the retina, and this circle is called the circle of diſſipation, becauſe the rays of a pencil, inſtead of being collected into a central point, are diſſipated all over this circle.

The conſideration of the circles of diſſipation, formed by the rays coming from the extremities of objects, is of uſe to account for ſeveral curious phænomena of viſion.

DISSOLVENT, in general, whatever diſſolves or reduces a ſolid body into ſuch minute parts as to be ſuſtained in a fluid.

The principal diſſolvents for metals, are aqua-regia and aqua-fortis; for ſalts, earths, and gums, water; for coral, and other alkaline ſubſtances, diſtilled vinegar or ſpirits of wine. See the article AQUA-REGIA, &c.

Diſſolvents are the ſame with what the chemiſts call menſtruums. See the article MENSTRUUM.

Univerſal **DISSOLVENT.** See the article ALKAHEST.

DISSOLUTION, in chemiſtry, the ſame with ſolution. See the articles SOLUTION and MENSTRUUM.

DISSOLUTION, in muſic, is when a ſound in the enharmonic genus is lowered three dieſes; for thereby that genus is diſſolved, and the muſic, or that interval at leaſt is chromatic.

DISSONANCE, in muſic, the ſame with diſcord. See the article DISCORD.

DISSYLLABLE, among grammarians, a word conſiſting only of two ſyllables: ſuch are nature, ſcience, *&c.*

DISTAFF, an inſtrument about which flax is tied in order to be ſpun.

DISTANCE, in general, an interval between two things, either with regard to time or place.

Dr. Berkley, in his eſſay on viſion, maintains that diſtance cannot of itſelf and immediately be ſeen, for diſtance being a line directed endwiſe to the eye, it projects only one point in the fund of the eye, which point remains invariably the ſame, whether the diſtance be longer or ſhorter. But Mr. Mac-Laurin obſerves, that the diſtance here ſpoken of, is diſtance from the eye; and that what is ſaid of it muſt not be applied to diſtance in general. The apparent diſtance of two ſtars is capable of the ſame variations as any other quantity or magnitude. Viſible magnitudes conſiſt of parts into which they may be reſolved as well as tangible magnitudes, and the proportions of the former may be aſſigned as well as thoſe of the latter; ſo that it is going too far to tell us, that viſible magnitudes are no more to be accounted the object of geometry than words; and that the ideas of ſpace, outneſs, and things placed at a diſtance, are not, ſtrictly ſpeaking, the object of ſight; and are not otherwiſe perceived by the eye than by the ear.

Acceſſible **DISTANCES**, in geometry, are ſuch as may be meaſured by the chain, *&c.* See CHAIN, THEODOLITE, *&c.*

Inacceſſible **DISTANCES**, are ſuch as cannot be meaſured by the chain, *&c.* by reaſon of ſome river, or the like, which obſtructs our paſſing from one object to another.

Inacceſſible diſtances may be meaſured in the following manner: ſuppoſe it were required to meaſure the diſtance between the ſtation A (plate LXXIII. fig. 6. n° 1.) and the object at C. Aſſume another ſtation as B, from whence the object may be ſeen. Then, with any proper inſtrument, take the angles C A B, and C B A, and meaſure the diſtance A B. Then, in the triangle A B C, are given three angles, and the diſtance A B, whence the diſtance A C required may be eaſily found thus: as the ſine of the angle C : the diſtance A B : : the ſine of the angle B : A C required.

But ſmall inacceſſible diſtances may be meaſured from one ſtation, in the following manner. Let A B (*ibid.* n° 2.) repreſent an inacceſſible diſtance to be meaſured; ſet up perpendicular a ſtick C A, of a known length, place the center of your quadrant C, on the top of the ſtick; and look through the ſights of it till the viſual ray points to the object at B. Then in the right angled triangle B A C, are given the perpendicular A C, and the angle A C B, and therefore, if A C be ſuppoſed the radius, the required ſide will be the tangent to the given angle A C B; whence to find A B it will be as the radius to A C, ſo is the tangent of the angle A C B, to A B required.

DISTANCE, in navigation, the number of minutes or leagues a ſhip has ſailed from any given place or point.

DISTANCE, in aſtronomy. The diſtance of the ſun, planets, and comets, is only found from their parallax, as it cannot be found either by eclipſes or their different phaſes: for from the theory of the motions of the earth and planets we know, at any time, the proportion of the diſtances of the ſun and planets from us; and the horizontal parallaxes are in a reciprocal proportion to theſe diſtances, See the article PARALLAX.

The mean diſtances of the planets from the ſun, in britiſh miles, have been uſually determined by aſtronomers, as follow.

Mercury	32,000,000	miles diſtant from the ſun.
Venus	59,000,000	
The Earth	81,000,000	
Mars	123,000,000	
Jupiter	424,000.000	
Saturn	777,000,000	

Theſe are the mean diſtances of the planets from the ſun, as determined by the various methods formerly uſed for finding the quantity of the ſun's parallax: but aſtronomers have been directed to a method of determining that parallax with much greater nicety, *viz.* to within the 308th part of the whole, which is ſurprizingly near the truth, in compariſon of the former methods, which could never come nearer than a tenth or a twelfth part, at moſt. Dr. Halley, in the year 1677, being in the iſland of St. Helena, obſerving the ſouthern fixed ſtars, had the pleaſure of ſeeing mercury tranſit the diſc of the ſun; and obſerved, that the duration of theſe tranſits could be found to the exactneſs of one ſecond of time. This caſual obſervation inſpired him with the thought that the parallax of the ſun, and conſequently his diſtance from the earth, might be found by proper obſervations on a tranſit of Venus over his diſc. Accordingly, he preſented a paper to the Royal Society, containing the method of finding the ſun's parallax, and conſequently his diſtance from the earth, by proper obſervations on a tranſit of Venus, which was to happen on the 6th of June, 1761. See *Philoſoph. Tranſact.* n° 348. But from obſervations ſince made on the planet Venus, it appears, that the tables uſed by Dr. Halley were not ſufficiently accurate, having not then made his own tables; and alſo, that, by an overſight, that great aſtronomer ſubtracted one angle from another, when he ſhould have added them together, conſequently his calculation is erroneous.

Tho' the obſervations made of this famous tranſit, by aſtronomers ſent from different ſtates in Europe to various parts of the earth for that purpoſe, have not yet been publiſhed; nor calculations made in conſequence of a comparative view of ſuch obſervations, we may venture to affirm that the dimenſions of the ſolar ſyſtem are much greater than they have been hitherto computed, and that, in conſequence of the obſervations made on the tranſit of Venus on the 6th of June 1761, the diſtance of the ſun from the earth will be found little ſhort of 120,000,000 of miles, and its diſtance from the other planets in proportion. See the articles PLANET, SUN, VENUS, and TRANSIT.

It is proper to obſerve, that on account of the very ſtrict laws, by which the motions of the planets are regulated, Venus is ſeldom ſeen within the ſun's diſc; and during the courſe of more than an hundred and twenty years, it could not be ſeen once, that is, from the year 1639 (when this pleaſing phænomenon was obſerved by that excellent youth Horrox, our countryman, but by none before him ſince the beginning of the world) to the year 1761. There will, however, be another tranſit of Venus, on the 3d of June 1769, which will afford ſtill a much better opportunity for finding the ſun's parallax, by almoſt the greateſt difference in the duration of theſe eclipſes that can poſſibly happen; and will, if properly obſerved, at Torne in Lapland, and the iſlands of Solomon in the ſouth ſea, afford as fine an opportunity of finding the ſun's parallax as can be wiſhed.

The diſtance of the fixed ſtars, as having no ſenſible parallax, can be little more than gueſſed at.

The diſtances of the ſecondary planets, from their reſpective primary ones, are as follow.

The moon is diſtant from the earth 60 ſemi diameters and a half of the earth, from its center, or 240,000 miles.

The firſt moon of jupiter is at the diſtance of $5\frac{6}{10}$ ſemi diameters of jupiter's body from his center, as meaſured with a micrometer.

The ſecond at the diſtance of nine ſemidiameters.

The third at the diſtance of $14\frac{3}{10}$ ſemidiameters.

The fourth at the diſtance of $25\frac{3}{10}$ ſemidiameters.

The firſt ſaturnian moon is at the diſtance of near 2 ſemidiameters of ſaturn's ring from its center.

The ſecond at the diſtance of $2\frac{2}{5}$ ſemidiameters of the ring.

The third at the diſtance of $3\frac{2}{3}$ ſemidiameters.

The fourth at the diſtance of 8 ſemidiameters.

The fifth at the diſtance of $23\frac{3}{10}$ ſemidiameters. See DIAMETER.

Curtate DISTANCE, the diſtance of a planet's place, reduced to the ecliptic, from the ſun. See the article CURTATE.

DISTANCE *of the eye*, in perſpective, is a line drawn from the eye to the principal point. See PERSPECTIVE.

DISTANCE *of the baſtions*, in fortification, is the ſide of the exterior polygon. See the article POLYGON.

DISTASTE properly ſignifies an averſion or diſlike to certain foods, and may be either conſtitutional, or owing to ſome diſorder of the ſtomach; in which laſt caſe emetics are recommended.

DISTEMPER, among phyſicians, the ſame with diſeaſe. See the article DISEASE.

DISTEMPER, in painting, a term uſed for the working up of colours with ſomething beſides water or oil. If the colours are prepared with water, that kind of painting is called limning; and if with oil, it is called painting in oil, and ſimply painting. If the colours are mixed with ſize, whites of eggs, or any ſuch proper glutinous, or unctuous matter, and not with oil, then they ſay it is done in diſtemper. In this manner the admirable cartoons at Hampton-court are painted. The greateſt diſadvantage of diſtemper is, that it has no glittering, and all its colours look dead, by which means they appear alike in all ſorts of lights, which oil colours, or even colours in diſtemper, when varniſhed, do not.

DISTEMPER, or **DISTEMPERATURE** *of plants.* See the article DISEASES *of plants.*

DISTENSION, in general, ſignifies the ſtretching or extending a thing to its full length or breadth.

DISTENSION, *diſtenſio*, among antient muſicians, is uſed in a ſynonymous ſenſe with interval. See INTERVAL.

DISTICH, διϛιχον, a couplet of verſes making a complete ſenſe. Thus hexameter and pentameter verſes are diſpoſed in diſtichs.

There are excellent morals in Cato's Diſtichs.

DISTICHIASIS, in ſurgery, a diſeaſe of the eye-lids, when under the ordinary eye-laſhes there grows another extraordinary row of hair, which frequently eradicates the former, and pricking the membrane of the eye, excites pain, and brings on a defluxion.

It is cured by pulling out the ſecond row of hairs with nippers, and cauterizing the pores out of which they iſſued.

DISTILLATION, in chemiſtry, the act of drawing off the ſpirituous, aqueous, oleaginous or ſaline parts of a mixed body from the groſſer and more terreſtrial parts by means of fire, and collecting and condenſing them again by cold. The end of diſtillation is of two kinds: the firſt, and by far the moſt general, is for the ſeparation of ſome acquired bodies, from others with which they were mixed, as in the caſe of vinous and volatile ſpirits, and eſſential oils: the other is for the quicker and more effectual combination of ſuch bodies, whoſe mixture is aſſiſted by a boiling heat, as in the caſe of ſpir. nitr. dulc.

Diſtillation is performed by ſeveral kinds of apparatus, for all which the general name is an alembic; to form each kind whereof, two or more veſſels are conjoined, *viz.* a proper reſervoir to contain the matter while the heat acts upon it, a refrigerant to condenſe the vapour as it riſes; and a receiver to contain it when condenſed. See the article ALEMBIC, RETORT, and RECEIVER.

Diſtillation is uſually performed by means of fire, raiſed to a greater or leſs degree of heat, as circumſtances require. And the fire is either applied immediately to the veſſels in which the matters are to be diſtilled; or it is applied mediately by means of water, ſand, iron-filings, *&c.* Hence theſe different methods are called balneum mariæ, balneum arenorum, *&c.* See the article BALNEUM.

Diſtillation is either *per aſcenſum*, by aſcent, or *per deſcenſum*, by deſcent. In the former, the matter to be diſtilled is above the fire, and the ſpirit or other principle is raiſed from it. In the latter, the matter to be diſtilled is below the fire, and the vapour drawn from it is precipitated to the bottom of the veſſel.

Diſtillation by aſcent is either right, performed with a common alembic, wherein the liquor is raiſed perpendicularly, and deſcends again in form of drops into a receiver, being chiefly uſed when the texture of the body allows of an eaſy aſcent, as in vegetables; or oblique, performed laterally, as in diſtillation by the retort; the uſe of this is for bodies, as almoſt all minerals and metals, which cannot be raiſed without a ſtrong impulſe, nor even by the ſtrongeſt, ſo high as the top of the alembic.

The proceſs and meaſures of diſtillation are very different, according to the different ſubjects to be diſtilled. Acid ſpirits are uſually drawn in a reverbatory furnace, and with a vehement fire: ponderous woods, as guaiacum, box, *&c.* are diſtilled in a retort after the ſame manner. Odoriferous plants, as baum, wormwood, ſage, hyſſop, *&c.* are diſtilled by the cucurbit, or veſica, firſt pouring a ſtrong decoction of the ſame plant hot upon the plant itſelf bruiſed, or adding common water to the plant, whether dry or freſh, cut into ſmall pieces, and letting the whole digeſt in a cloſe veſſel for two days. In diſtilling plants that are not odoriferous, pound the plant, and then fill two thirds of the veſica or alembic with it; after which pour a good quantity of the expreſſed juice of the ſame plant upon it, ſo as the bruiſed matter may float therein, without ſticking any where to the veſſel; then draw off about half as much water as there was juice, which is the diſtilled water of the plant: if what remains be preſſed in a cloth, and the ſettled juice be filtrated and evaporated to two thirds, then ſetting it in a cool place, the eſſential ſalt ſhoots into cryſtals.

The precautions to be uſed in regard to diſtillation, are, 1. To leave ſufficient room in the containing veſſel for the expanſion and ebullition of the matter to be diſtilled, otherwiſe it is very apt to overflow in the neck, and break the veſſels if of glaſs, hazard the firing of the building in caſe of vinous ſpirits, and fruſtrate the operation in all. 2. To take care that the condenſing ſurface be ſufficiently large, and the heat accomodated to it; for if an error of this kind occur in the caſe of the worm-ſtill, the head will be blown off, and the vapour diſſipated with conſiderable loſs; and in that of vinous ſpirits, whoever may happen to be in the place will be in very great danger. 3. It is neceſſary in diſtillation, as well as in digeſtion, to avoid luting the veſſels too cloſely with any tenacious ſubſtance; for if a ſufficient vent be not left for the eſcape of the air which is generated during the diſtillation of ſome ſubſtances, as alſo for the expanſion which attends the increaſe of heat of that air which is included in the veſſels at the time of their junction, the veſſels will be in extreme danger of being burſt with great violence.

The method of diſtilling malt-waſh, or a fermented mixture of meal and malt, for ſpirit. Fill two thirds of a ſtill, firſt moiſtened by the ſteam of boiling water, with malt-waſh, immediately clap on the head, and lute it down, there will ſoon run a ſpirituous inflammable liquor. Thus is obtained what the malt-diſtillers call a malt low-wine; what comes over after the ſpirit falls off from being proof, is called faints. This experiment may be rendered general, with ſlight variation; for if any wine, beer, or fermented liquor from ſugar, treacle, or fruits, &c. be thus treated, it affords a ſpirit differing only according to the nature of the ſubject: but none of them will afford the leaſt inflammable ſpirit without a previous fermentation. The requiſite cautions for ſucceſs, are, 1. That the fermentation be well performed. 2. That it be gently diſtilled, with a ſoft well regulated fire. 3. That the groſſer oil, apt to riſe along with the ſpirit, be let out by flannel under the noſe of the worm. Theſe cautions obſerved, the low-wines will be pure and vinous.

The method of diſtilling the lower wines into proof ſpirits for ſale. The lower wines of the laſt proceſs, diſtilled in a bath-heat, give a higher rectified ſpirit than before, which being let down with fair water to a certain ſize or ſtandard, called proof, is what the malt-diſtillers underſtand by proof-goods, or their rectified malt-ſpirit.

The inconveniences of this art, on account of the many large veſſels required, which increaſe the labour and price of the commodity, might perhaps be remedied by the introduction of a new art, ſubſervient to the malt diſtillers, and confined to the boiling down the malt-wort to a rob; wherefore it were to be wiſhed that thoſe who were ſkilled in this branch of diſtillation would try whether a ſpirit ſuperior to that of treacle may not be procured from the rob of malt, prudently prepared and fermented. See the article RECTIFICATION.

Combinatory DISTILLATION, a term uſed by Dr. Shaw, to expreſs that ſort of rectification of diſtilled ſpirits, which is done with additions, and which he otherwiſe calls *improper rectification*, by way of diſtinction from that called proper rectification which is only the method of reducing a ſpirit to its utmoſt degree of purity and perfection. Malt-ſpirit is the general ſubject of combinatory diſtillation, and the means to rectify it on this plan may be reduced to three heads: 1. That by fixed alkaline ſalts alone. 2. That by fixed alkaline ſalts and acid ſpirits. And, 3. That by ſaline bodies and flavouring additions. The effect of this operation, when carefully performed, is to attenuate and thin the ſpirit, and to keep back a part of its groſs and fetid oil, and ſo far to alter the part of the oil which comes over, as ſcarce to leave the ſpirit diſtinguiſhable from a malt ſpirit.

The ſalts uſed on this occaſion are either the fixed alkalies, as potaſh and calcined tartar, or decrepitated common ſalt, or calcined vitriol, alum, or ſandiver. The moſt common flavourers are mace, orrice-roots, parſnips, artichoaks, rhodium, raiſin-ſtalks, damaſk roſes, wine lees, rape or grape huſks, and the oil of wine, which is infinitely preferable to all the others, but is not ſo well known. The ultimate perfection aimed at in all the proceſſes of combinatory diſtillation, is the depurating the engliſh malt-ſpirit at one operation,

tion, ſo as to render it taſteleſs and inodorous and yet vinous; or elſe to make it reſemble the french brandy, arrack, or ſome other low-flavoured vinous ſpirits.

DISTILLED, ſomething that has undergone the action of diſtillation: thus we ſay diſtilled water, diſtilled vinegar, *&c.* See the preceding article.

DISTILLER, he who makes diſtillations, and commonly denotes a tradeſman who makes ſpirits from malt, *&c.*

Diſtillers are to make an entry of all warehouſes for keeping brandy, on pain of 20 l. and forfeiture of the liquor; and no brandy ſhall be ſold but in places entered, under penalty of 40 s. a gallon.

By ſtat. 24 Geo. II. diſtillers who ſhall knowingly ſell ſpirituous liquors to be unlawfully retailed, or to any unlicenſed retailer, forfeit 10 l. and treble the value of the liquors ſo ſold and delivered; and ſuch unlawful retailer, diſcovering and convicting the diſtiller, is intitled to his ſhare of the penalty, and indemnified againſt the penalties incurred by himſelf. The ſame act further provides, that no perſon whatſoever ſhall recover, either in law or equity, any debt for ſpirituous liquors under 20 s. contracted at one time; nor ſhall any item in any account for ſuch be allowed, where the value of ſuch item ſhall not amount to 20 s. at the leaſt. Diſtillers are alſo to give notice to the gauger, before they receive any fermented waſh, of the quantity, *&c.* under penalty of 50 l. They are alſo to make entry of all veſſels for diſtillation, under the ſame penalty of 50 l. and forfeit 20 l. for defacing the gauger's mark.

DISTILLERY, the art of diſtilling brandies, and other ſpirits. See the article DISTILLATION.

To this art likewiſe belong the peculiar proceſſes of brewing and fermentation, the knowledge of proper additions, and the rectification of ſpirits. See the articles BREWING, FERMENTATION, ADDITION and RECTIFICATION.

DISTINCT NOTION, or IDEA, is that wherein the mind perceives a difference from all other ideas.

It will be uſeful, ſays Mr. Locke, to diſtinguiſh ideas as they are perceptions in our minds, from what they are in the bodies that cauſe ſuch perceptions in us; for we are not to think the former exact images and reſemblances of ſomething inherent in the ſubject, moſt of thoſe of ſenſation being in the mind no more the likeneſs of ſomething exiſting without us, than the names that ſtand for them are the likeneſs of our ideas, which yet upon hearing they are apt to excite in us.

DISTINCT BASE, in optics, is that diſtance from the pole of a convex glaſs, in which objects beheld through it appear diſtinct and well deſcribed, ſo that it is the ſame with the focus. See FOCUS.

The diſtinct baſe is cauſed by the collection of the rays that proceed from a ſingle point in the object into a ſingle point in the repreſentation; and therefore concave glaſſes, which diſſipate the rays, can have no real diſtinct baſe.

DISTINCTION, in logic, is an aſſemblage of two or more words, whereby diſparate things, or their conceptions, are denoted. There are three kinds of diſtinctions taken from the three different modes of exiſtence, real, modal, and rational. The firſt is that between two ſubſtances, or the modes of two ſubſtances. The ſecond, or modal diſtinction, is that between ſeveral things, one whereof may exiſt without the other, but not *vice verſa*, the other without that. The third, or rational diſtinction, is that between ſeveral things which are really one and the ſame, and whereof one cannot exiſt without the other; nor *vice verſa*, the other without this: ſuch is that between a thing and its eſſence, between the eſſences and properties, *&c.* Of this diſtinction ſome authors admit two kinds, the one barbarouſly called *rationis ratiocinatæ*, having ſome foundation in things, as when we diſtinguiſh the juſtice of God from his mercy; the other called *rationis ratiocinantis*, which has no foundation at all, and therefore is by many rejected.

Metaphyſical DISTINCTION is the non-agreement of being, whereby this entity is not that, or one thing is not another. See the article ESSENCE.

DISTINCTION, *diſtinctio*, or *diſtinguo*, is alſo uſed, in the ſchools, as an expedient to evade an argument, or to clear up and unfold an ambiguous propoſition, which may be true in one ſenſe, and falſe in another: as we ſay, The reſpondent was hard preſſed, but he diſengaged himſelf by a diſtinguo.

DISTORTION, in medicine, a contraction of one ſide of the mouth, occaſioned by a convulſion of the muſcles of one ſide of the face: and it is likewiſe uſed to denote any part of an animal body, when it is ill placed or ill favoured.

It is very juſtly obſerved, that this terrible malady to the human ſhape has often been the mere effect of careleſſneſs and ill habits.

DISTORTOR ORIS, in anatomy, a muſcle otherwiſe called zygomaticus. See the article ZYGOMATICUS.

DISTRACTION, *diſtractio*, in chemiſtry, a forcible diviſion of ſubſtances from each other, which were before united, either by ſeparation or calcination.

DISTRACTION, in medicine, ſometimes denotes the act of pulling a fibre, membrane, or the like, beyond its natural extent.

DISTRAINING, in law, the ſame with attaching. See ATTACHING.

DISTRESS, in law, the ſeizing or diſtraining any thing for rent in arrear, or other duty unperformed.

The effect of this diſtreſs is to compel the party either to replevy the things diſtrained, and conteſt the taking, in an action of treſpaſs againſt the diſtrainer; or rather to oblige him to compound and pay the debt or duty, for which he was ſo diſtrained.

There are likewiſe compulſory diſtreſſes in actions, to cauſe a perſon appear in court; of which kind there is a diſtreſs perſonal of one's moveable goods, and the profits of his lands, for contempt in not appearing after ſummons: there is likewiſe diſtreſs real, of a perſon's immoveable goods. In theſe caſes none ſhall be diſtrained to anſwer for any thing touching their freeholds, but by the king's writ. Diſtreſs may be either finite or infinite: Finite diſtreſs is that which is limited by law, in regard to the number of times it ſhall be made, in order to bring the party to a trial of the action. Infinite diſtreſs is that which is without any limitation, being made till the perſon appears: it is farther applied to jurors that do not appear, as upon a certificate of aſſiſe, the proceſs is venire facias, habeas corpora, and diſtreſs infinite.

It is alſo divided into grand diſtreſs and ordinary diſtreſs; of theſe the former extends to all the goods and chattels that the party has within the county. A perſon, of common right, may diſtrain for rents and all manner of ſervices: and where a rent is reſerved on a gift in tail, leaſe for life, or years, *&c.* though there be no clauſe of diſtreſs in the grant or leaſe, ſo as that he has the reverſion: but on a feoffment made in fee, a diſtreſs may not be taken, unleſs it be expreſly reſerved in the deed.

DISTRIBUTION, in a general ſenſe, the act of dividing a thing into ſeveral parts, in order to the diſpoſing each in its proper place.

DISTRIBUTION, in architecture, the dividing and diſpenſing the ſeveral parts and pieces which compoſe a building, as the plan directs.

Diſtribution of ornaments, is an equal orderly placing of the ornaments in any member of architecture.

DISTRIBUTION, in logic, is a kind of diviſion which diſtinguiſhes an univerſal whole into its ſeveral kinds of ſpecies; as diviſion is to diſtinguiſh an integral whole into its ſeveral parts.

The rules of a good diſtribution are much the ſame as thoſe of diviſion. See the article DIVISION.

DISTRIBUTION, in rhetoric, a kind of deſcription, whereby an orderly diviſion and enumeration is made of the principal qualities of the ſubject. David ſupplies us with an example of this kind, when in the heat of his indignation againſt ſinners, he gives a deſcription of their iniquity, "Their throat is an open ſepulchre; they flatter with their tongues; the poiſon of aſps is under their lips; their mouth is full of curſing and lies; and their feet are ſwift to ſhed blood."

DISTRIBUTION, in printing, the taking a form aſunder, ſeparating the letters, and diſpoſing them in the caſes again, each in its proper cell. See PRINTING.

DISTRIBUTIVE JUSTICE, is that whereby we give every perſon what properly belongs to him.

DISTRIBUTIVES, in grammar. See the article NUMERALS.

DISTRICT, in geography, a part of a province, diſtinguiſhed by peculiar magiſtrates, or certain privileges; in which ſenſe it is ſynonymous with hundred. See the article HUNDRED.

It is alſo uſed to denote the territory belonging to a city, town, or borough; or the extent of a judge's juriſdiction. See the articles TERRITORY and JURISDICTION.

DISTRINGAS, in law, a writ commanding the ſheriff, or other officer, that he diſtrain a perſon for debt to the king, *&c.* or for his appearance at a certain day. There is a great diverſity of this writ.

DISTRINGAS JURATORES, a writ directed to the ſheriff, whereby he is commanded to diſtrain upon a jury, to appear, and to return iſſues on their lands, *&c.* for non-appearance. This writ of diſtringas juratores iſſues for the ſheriff to have their bodies in court, *&c.* at the return of the writ.

DISVELLOPED, in heraldry, is uſed much in the ſame ſenſe with diſplayed, as flying colours are ſaid to be diſvelloped.

DISUNITE, in the manege, is ſaid of a horſe that drags his haunches in galloping.

DITCH, in country-affairs, a narrow channel or trench made for draining marſhy grounds, the conveyance of water, or incloſing fields.

Ditches for draining muſt be more or leſs deep and wide, according as there is more or leſs water to be carried off. Ditches uſed about incloſures are five or ſix feet wide, and proportionably deep, where there is no quick-ſet hedges; but where theſe are ſet on the banks, they are only three feet wide at the top, one at the bottom, and two deep: the ſlope is of great advantage, as by means of it the ſides of the ditch are prevented from being waſhed down. See the articles DRAINS and INCLOSURE.

DITCH, in fortification, the ſame with moat. See the article MOAT.

DITHYRAMBIC, ſomething belonging to the dithyrambus, as a dithyrambic verſe, a dithyrambic poet, *&c.* See the next article.

The dithyrambic poetry was very bold and irregular, for the poets not only took the liberty to forge new words for the purpoſe, but made double and compound words, which contributed very much to the magnificence of this ſort of poetry.

DITHYRAMBUS, in antient poetry, a hymn in honour of Bacchus, full of tranſport and poetical rage.

This poetry owes its birth to Greece, and to the tranſports of wine; and yet art is not quite exploded, but delicately applied to guide and reſtrain the dithyrambic impetuoſity, which is indulged only in pleaſing flights. Horace and Ariſtotle tell us, that the antients gave the name of dithyrambus to thoſe verſes wherein none of the common rules or meaſures were obſerved. As we have now no remains of the dithyrambus of the antients, we cannot ſay exactly what their meaſure was.

DITMARSH, a territory in the dutchy of Holſtein. See HOLSTEIN.

DITONE, in muſic, an interval comprehending two tones. The proportion of the ſounds that form the ditone is 4 : 5, and that of the ſemiditone is 5 : 6. F. Parron makes the ditone the fourth kind of ſimple concord, as comprehending two tones, according to Ariſtotle, a greater and a leſs. Others make it the firſt diſcord, dividing the ditone into eighteen equal parts, or commas; the nine on the acute ſide making the greater tone, as aſſerted by Salmon de Caux.

DITRIGLYPH, in architecture, the ſpace between two triglyphs. See TRIGLYPH.

DITRIHEDRIA, in foſſil hiſtory, a genus of ſpars with twice three ſides, or ſix planes, being formed of two trigonal pyramids joined baſe to baſe, without any intermediate column. See SPAR.

Of this genus there are five known ſpecies, 1. One with long and pointed pyramids, found in the mines of Cornwall, and ſome other parts of England. 2. One with long and broad pyramids, found looſe in the fiſſures of the alabaſter quarries of Blanckenberg in Germany. 3. One with ſhort and broad pyramids found in the mines of Rammelſberg. 4. One with extremely broad depreſſed pyramids, found in the alabaſter quarries at Blanckenberg, and ſometimes in the mines of Goſſelaer in Saxony. 5. One with ſhort but ſharp pointed pyramids, found very frequently in the mines of the Hartz-foreſt, and ſometimes on Mendip Hills with us.

The ſpecies of ditrihedria are diſtinguiſhed by the different figures of theſe pyramids.

DITTANY, *dictamnus*, in botany, *&c.* See the article DICTAMNUS.

DITTO, uſually written D°, in books of accounts, an italian word, ſignifying *the aforementioned.*

DIVAL, in heraldry, the herb nightſhade, uſed by ſuch as blazon by flowers and herbs, inſtead of colours and metals, for ſable or black.

DIVALIA, the ſame with angeronalia. See the article ANGERONALIA.

This feaſt was inſtituted on occaſion of a diſeaſe which deſtroyed man and beaſt. It was held on December 21, when the pontiffs performed ſacrifice in the temple of Voluptia, or the goddeſs of joy and pleaſure, and was the ſame with Angerona, ſuppoſed to drive away all ſorrows and chagrins in life.

DIU, a little iſland and town on the coaſt of Guzurat, in the hither India, and ſubject to Portugal: eaſt lon. 69°, north lat. 21° 15′.

DIVAN, a council chamber, or court of juſtice, among the eaſtern nations, particularly the Turks.

DIVAN-BEGHI, the ſuperintendant of juſtice in Perſia, whoſe place is the laſt of the ſix miniſters of the ſecond rank, who are all under the athemadauler, or firſt miniſter. To this tribunal of the divan-beghi appeals lie from ſentences paſſed by the governors: he has a fixed ſtipend of 50,000 crowns for adminiſtring juſtice: All the ſerjeants, uſhers, &c. of the court, are in his ſervice: he takes cognizance of the criminal cauſes of the chams, governors, and other great lords of Perſia, when accuſed of any fault. There are divan beghi's not only at court, and in the capital, but alſo in the provinces, and other cities in the empire. The alcoran is the ſole rule of his adminiſtration of juſtice, which alſo he interprets at pleaſure. He takes no cognizance of civil cauſes, but all differences ariſing between the officers of the king's houſhold, and between foreign miniſters, are determined by him.

DIVER, *colymbus*, in ornithology, the engliſh name of a genus of birds, for the characters of which ſee COLYMBUS.

Of this genus there are a great many beautiful ſpecies. The ſpeckled diver, about the bigneſs of a tame duck, is repreſented in plate LXXIV. n° 1. The hinder part of the neck is of an aſh colour; the back and wings are black, ſpotted with white; the throat is black, and belly white. This is thought to be the cock of the red-throated ducker, or loon, repreſented *ibid.* n° 2. The upper part of the body of this laſt is of a dark grey colour, the quill feathers of the wings approaching to black: the legs and feet of both are of a blackiſh colour.

DIVERGENT, or DIVERGING LINES, in geometry, are thoſe which conſtantly recede from each other.

DIVERGENT RAYS, in optics, are thoſe which going from a point of the viſible object, are diſperſed, and continually depart one from another, in proportion as they are removed from the object: in which ſenſe it is oppoſed to convergent. See the article CONVERGING.

Concave glaſſes render the rays divergent, and convex ones convergent.

Concave mirrors make the rays converge, and convex ones make them diverge. See CONCAVE and CONVEX.

DIVERGENT, or DIVERGING HYPERBOLA, one whoſe legs turn their convexities towards one another, and run outwards quite contrary ways. See HYPERBOLA.

Point of DIVERGENCY. See the article *Virtual* FOCUS.

DIVERSIFYING, among orators, is the handling a ſubject different ways, in order to throw new light on it, and enforce it the ſtronger on the hearers.

According to Voſſius, there are ſix ways of doing this: 1. By enlarging on what was ſaid before. 2. By recapitulating. 3. By adding ſomething new. 4. By repeating the principal heads. 5. By urging the ſame arguments, only in a different order. 6. By imitating them.

DIVERSION, in military affairs, is, when an enemy is attacked in one place where they are weak and unprovided, in order to draw off their forces from another place, where they have made, or intend to make, an irruption. Thus the Romans had no other way in their power of driving Hannibal out of Italy, but by making a diverſion, in attacking Carthage.

DIVERSION, in phyſic, is when by means of medicines, an attempt is made to give a different turn to the flux of humours: thus blood letting makes a great diverſion.

DIVERSITY, in logic, ſtands in oppoſition to identity. See IDENTITY.

DIVERSITY, in painting, conſiſts in giving every part or figure in a piece, its proper air and attitude.

The ſkilful painter has the penetration to diſcern the character of nature, which varies in all men: whence the countenances and geſtures of the perſons he paints continually vary.

DIVESTING, or DIVESTITURE, in law, is uſed for the act of ſurrendering one's effects. By a contract of donation, or ſale, the donor, or ſeller, is ſaid to be diſſeiſed and diveſted of his property, in ſuch a commodity. In this ſenſe it ſtands contradiſtinguiſhed from inveſtiture, where the donee or purchaſer becomes inveſted with the property of the donor or ſeller. See the articles INVESTITURE and DISSEISIN.

DIVIDEND, in arithmetic, the number propoſed to be divided into equal parts. It muſt always be greater than the diviſor. See DIVISOR and DIVISION.

DIVIDEND, in the exchequer, is one part of an indenture, as uſed in the ſtat. 10 Ed. I. c. 11.

DIVIDEND, in law proceedings, is taken for a dividing of fees and perquiſites between officers of courts, ariſing from writs, &c.

Dividend *of ſtocks*, is a ſhare, or proportion of the intereſt of ſtocks erected on public funds, as the ſouth-ſea, *&c.* divided among, and paid to the adventurers half yearly.

Stealing of any dividend warrants of the Bank, South ſea company, Eaſt-india company, or of any other corporation, is made felony, with or without benefit of clergy, in the ſame manner as if the offender had ſtolen, or taken by robbery, goods to the value of the money due on ſuch dividend warrants. Stat. 2 Geo. II. c. 25, ſ. 3.

Dividend, in the univerſity, ſignifies that part or ſhare which every one of the fellows equally divide among themſelves of their yearly ſtipend.

DIVINATION, the knowledge of things obſcure, or future; which cannot be attained by any natural means.

It was a received opinion among the heathens, that the Gods were wont to converſe familiarly with ſome men, whom they endowed with extraordinary powers, and admitted to the knowledge of their councils and deſigns. Plato, Ariſtotle, Plutarch, Cicero, and others, divide divination into two ſorts, or ſpecies, *viz.* natural and artificial. The former was ſo called, becauſe not attained by any rules or precepts of art, but infuſed or inſpired into the diviner without his taking any farther care about it, than to purify and prepare himſelf for the reception of the divine afflatus. Of this kind were all thoſe who delivered oracles, and foretold future events by inſpiration, without obſerving external ſigns or accidents. The ſecond ſpecies of divination was called artificial, becauſe it was not obtained by immediate inſpiration, but was the effect of experience and obſervation. Such was ſouthſaying, as depending upon human art and invention, which however was ſuppoſed not to be altogether deſtitute of divine direction and concurrence, and ſuch was divination by lots. Of this ſort there were various kinds, as by ſacrifices, entrails, flame, cakes, flour, wine, water, augury, birds, lots, verſes, omens, *&c.* The ſeveral ſorts of divination are alectoromantia, alphitomancy, arithmomancy, axinomancy, bellomancy, catoptromancy, ceromancy, chiromancy, cledomancy, dactiliomancy, gaſtromancy, geomancy, hydromancy, lithomancy, necromancy, oneirocritica, *&c.* See the article Alectoromantia, *&c.*

DIVINE, ſomething relating to God. See the article God.

Divine stone, in natural hiſtory, a ſpecies of the jaſper. See Jasper.

The indians attribute great medicinal virtues to this ſtone: they wear it externally as a cure for the gravel; they ſay it promotes urine extremely, and ſeldom fails to bring away large quantities of gravel with it, when there has been any lodged in the paſſages; they wear it alſo by way of amulet, to preſerve them from the bites of venomous animals, and tie it to the part bitten, by way of cure.

DIVING, the art of deſcending under water, to conſiderable depths, and abiding there a competent time. The uſes of diving are conſiderable, particularly in fiſhing for pearls, corals, ſponges, wrecks, of ſhips, *&c.* See Pearl, *&c.*

There have been various engines contrived to render the buſineſs of diving ſafe and eaſy; the great point is to furniſh the diver with freſh air, without which he muſt either make but a ſhort ſtay, or periſh. Thoſe who dive for ſponges in the Mediterranean, carry down ſponges dipt in oil in their mouths; but conſidering the ſmall quantity of air that can be contained in the pores of a ſponge, and how much that little will be contracted by the preſſure of the incumbent air, ſuch a ſupply cannot ſubſiſt a diver long, ſince a gallon of air is not fit for reſpiration above a minute. See the next article.

Diving-bell, a machine contrived for the ſafe conveyance of a diver to any reaſonable depth, and whereby he may ſtay more or leſs time under water, as the bell is greater or leſs.

That the reader may have a juſt idea of the diving-bell, according to the lateſt improvements by Dr. Halley, and Mr. Triewald of Stockholm, we have here exhibited two figures of the ſame. The firſt (plate LXXV. fig. 1. n° 1.) is that of Dr. Halley's form, which was three feet wide at top, five at bottom, and eight feet high, and contained about ſixty-three cubic feet, or near eight hogſheads in its concavity.

This was coated with lead, ſo heavy, that it would ſink empty, and the weight was diſtributed about the bottom I K, ſo that it would go down in a perpendicular poſition, and no other. In the top was fixed a ſtrong but clear glaſs D, to let in the light from above; and likewiſe

wiſe a cock, as at B, to let out the hot air that had been breathed; and below, was fixed a circular ſeat, L M, for the divers to ſit on; and laſtly, from the bottom was hung, by three ropes, a ſtage for the divers to ſtand on, to do their buſineſs. This machine was ſuſpended from the maſt of a ſhip by a ſprit, which was ſufficiently ſecured by ſtays to the maſt-head, and was directed by braces to carry it over-board, clear of the ſide of the ſhip, and to bring it in again.

To ſupply the bell with air under water, two barrels, ſuch as C, of about ſixty-three gallons each, were made, and caſed with lead, ſo that they might ſink empty, each having a hole in its loweſt part, to let in the water, as the air in them is condenſed in their deſcent, and to let it out again when they were drawn up full from below. And to a hole in the top of the barrel was fixed a hoſe, or hollow pipe, well prepared with bees-wax and oil, which was long enough to fall below the hole at the bottom, being ſunk with a weight appended, ſo that the air in the upper part of the barrels could not eſcape, unleſs the lower end of theſe pipes were firſt lifted up.

Theſe air barrels were fitted with tackle proper to make them riſe and fall alternately, like two buckets in a well. In their deſcent they were directed by lines faſtened at the under edge of the bell to the man ſtanding on the ſtage to receive them, who, by taking up the ends of the pipes above the ſurface of the water in the bell, gave occaſion for the water in the barrels to force all the air in the upper parts into the bell, while it entered below, and filled the barrels; and as ſoon as one was diſcharged by a ſignal given, it was drawn up, and the other deſcended to be ready for uſe.

As the cold air ruſhed into the bell from the barrel below, it expelled the hot air (which was lighter) through the cock B, at the top of the bell, which was then opened for that purpoſe. By this method air is communicated ſo quick, and in ſuch plenty, that the doctor tells us, he himſelf was one of the five who was at the bottom in nine or ten fathom water, for above an hour and an half at a time, without any ſort of ill conſequence; and he might continue there ſo long as he pleaſed, for any thing that appeared to the contrary.

In going down, it is neceſſary it ſhould be very gentle at firſt, that the denſe air may be inſpired to keep up, by its ſpring, a balance to the preſſure of the air in the bell: upon each twelve feet deſcent, the bell is ſtopt, and the water that enters is driven out by letting in three or four barrels of freſh air.

By the glaſs above, ſo much light was tranſmitted, when the ſun ſhone, that he could ſee perfectly well to write and read, and by the return of the air-barrels, he could ſend up orders, written with an iron pen, on ſmall pieces of lead, directing, that they were to be moved from place to place: but in dark weather, when the ſea was rough and troubled, it would be as dark as night, in the bell; but then the doctor perceived he could keep a candle burning in the bell, as long as he pleaſed, it being found, by experiment, that one candle conſumes much about the ſame quantity of confined air, as one man does, *viz.* about a gallon per minute. The only inconvenience the doctor complained of, was, that upon firſt going down, they felt a ſmall pain in their ears, as if the end of a quill were forcibly thruſt into the hole of the ear. This may proceed from its being ſome time before the air can get from the mouth, through the ſmall canal of the euſtachian tube, which leads to the inner cavity of the ear, where, when it comes, it makes an equilibrium with the outward air, preſſing on the tympanum, and thus the pain, for a ſhort time, ceaſes: then deſcending lower, the pain of the ear returns, and is again abated; and ſo on, till you come down to the bottom, where the air is of the ſame denſity continually.

This bell was ſo improved by the doctor, that he could detach one of his divers to the diſtance of fifty, or a hundred yards from it, by a contrivance of a cap, or head-piece, ſomewhat like an inverted hand-baſket, as at F, with a glaſs in the fore-part, for him to ſee his way through. This cap was of lead, and made to fit quite cloſe about his ſhoulders; in the top of it was fixed a flexible pipe, communicating with the bell, and by which he had air, when he wanted, by turning a ſtop cock near his head-piece. There was alſo another cock at the end in the bell, to prevent any accident happening from the perſon without. This perſon was always well cloathed with thick flannels, which were warmed upon him, before he left the bell, and would not

Fig. 1. DIVING-BELLS.

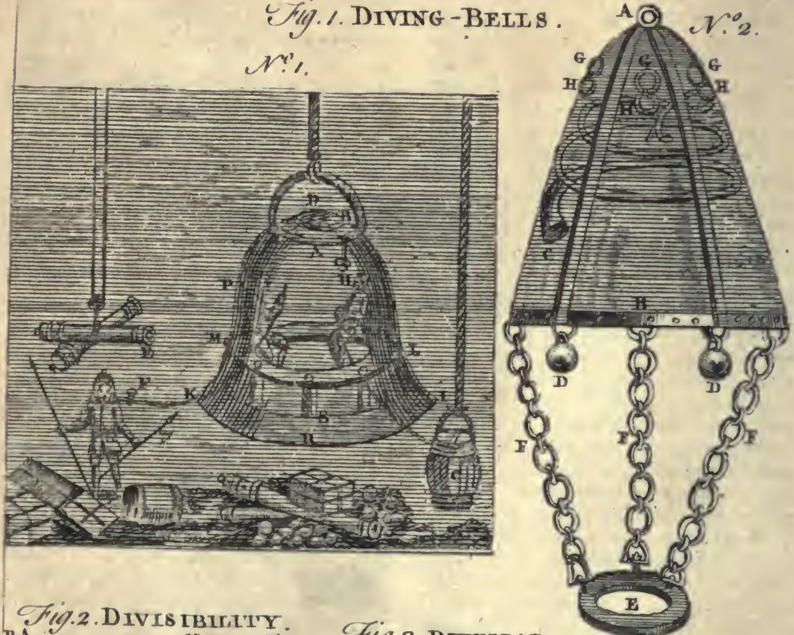


Fig. 2. DIVISIBILITY.

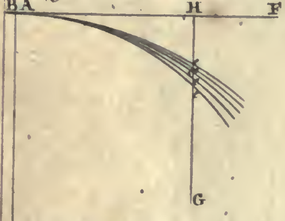


Fig. 3. DIURNAL.

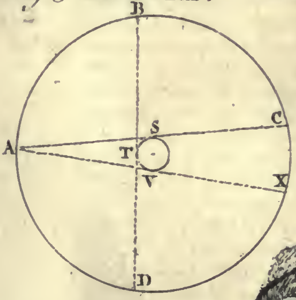
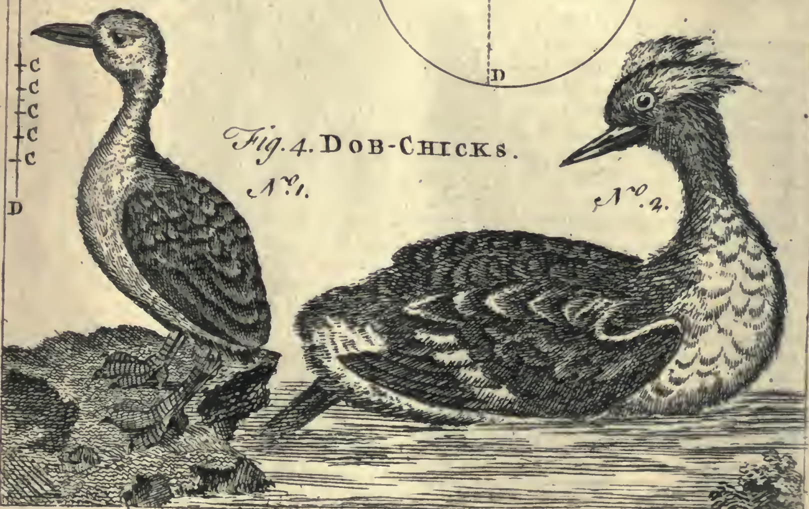


Fig. 4. DOB-CHICKS.



J. Jefferys sculp

not ſuffer the cold water to penetrate. His cap contained air enough to ſerve him a minute or two, then by raiſing himſelf above the bell, and turning the cock F, he could repleniſh it with freſh air. This pipe he coiled round his arm, which ſerved him as a clue to find his way to the bell again.

This diving bell received its laſt improvement from Mr. Martin Triewald F. R. S. and military architect to his ſwediſh majeſty. The manner and form whereof is ſhewn in a figure of his own drawing (ibid. n° 2.) A B is the bell, which ſinks with leaden weights D, D, appended to the bottom: the ſubſtance of the bell is copper, and tinned within all over: the bell is illuminated with three ſtrong convex lenſes G, G, G, with copper lids H, H, H, to defend them. The iron ring, or plate E, ſerves the diver to ſtand on, when he is at work, and it is ſuſpended at ſuch a diſtance from the bottom of the bell, by the chains F, F, F, that when the diver ſtands upright, his head is juſt above the water in the bell, where it is much better than higher up in it, becauſe the air is colder, and conſequently more freſh, and fit for reſpiration: but as there is occaſion for the diver to be wholly in the bell, and his head of courſe in the upper part, Mr. Triewald has contrived that, even there, when he has breathed the hot air as long as he well can, by means of a ſpiral copper tube *b c*, placed cloſe to the inſide of the bell, he may draw the cooler and freſher air from the lowermoſt parts; to which end, a flexible leather tube, about two feet long, is fixed to the upper end of the tube at *b*; and to the other end of this tube is fixed an ivory mouth-piece for the diver to hold in his mouth, by which to reſpire the air from below.

Diving-bladder, a term uſed by Borelli, for a machine which he contrived for diving under water to great depths. The veſica, or bladder, as it is called, is to be of braſs or copper, and about two feet diameter. This is to contain the diver's head, and is to be fixed to a goat's ſkin exactly fitted to the body of the diver. Within the veſica are pipes, by means of which, a circulation of air is contrived, and the perſon carries an air pump by his ſide, in order to make himſelf heavier and lighter, as the fiſhes do by contracting or dilating their air-bladder.

DIVINITY, properly ſignifies the nature, quality, and eſſence of the true God. See the article God.

The heathen divinities may be reduced to three claſſes, 1. Theological, repreſenting the divine nature under divers attributes. Thus Jupiter is the abſolute power of God, Juno his juſtice, *&c.* 2. Phyſical. Thus Eolus is that power in nature which collects vapours and exhalations, in order to form winds. 3. Moral. For example, the furies are only the ſecret reproaches and ſtings of conſcience.

Divinity, is alſo uſed in the ſame ſenſe with theology. See Theology.

DIVISIBILITY, that property by which the particles of matter in all bodies are capable of a ſeparation, or diſunion from each other.

The Peripatetics and Carteſians hold diviſibility to be an affection of all matter. The Epicureans again, allow it to agree to every phyſical continuum, but they deny that this affection agrees to all bodies, for the primary corpuſcles or atoms they maintain to be perfectly inſecable and indiviſible. See Atom.

As it is evident that body is extended, ſo it is no leſs evident that it is diviſible; for ſince no two particles of matter can exiſt in the ſame place, it follows, that they are really diſtinct from each other, which is all that is meant by being diviſible. In this ſenſe the leaſt conceivable particle muſt ſtill be diviſible, ſince it will conſiſt of parts which will be really diſtinct. To illuſtrate this by a familiar inſtance, let the leaſt imaginable piece of matter be conceived lying on a ſmooth plain ſurface, it is evident the ſurface will not touch it every where: thoſe parts therefore which it does not touch, may be ſuppoſed ſeparable from the others, and ſo on, as far as we pleaſe; and this is all that is meant when we ſay matter is infinitely diviſible.

The infinite diviſibility of mathematical quantity is demonſtrated thus geometrically. Suppoſe the line A D (plate LXXV. fig. 2.) perpendicular to B F, and another, as G H, at a ſmall diſtance from it, alſo perpendicular to the ſame line: with the centers C, C, C, *&c.* deſcribe circles cutting the line G H in the points *e*, *e*, *e*, *&c.* Now the greater the radius A C is, the leſs is the part *e* H. But the radius may be augmented in infinitum, ſo long therefore, the part *e* H may be divided into ſtill leſs portions, conſequently it may be divided in infinitum.

All that is ſuppoſed in ſtrict geometry, (ſays Mr. Maclaurin) concerning the diviſibility of magnitude, amounts to no more than that a given magnitude may be conceived to be divided into a number of parts, equal to any given or propoſed number. It is true, that the number of parts into which a given magnitude may be conceived to be divided, is not to be fixed or limited, becauſe no given number is ſo great but a greater may be conceived and aſſigned: but there is not, therefore, any neceſſity of ſuppoſing the number of parts actually infinite; and if ſome have drawn very abſtruſe conſequences from ſuch a ſuppoſition, yet geometry ought not to be loaded with them.

How far matter may actually be divided, may in ſome meaſure be conceived from hence, that a piece of wire gilt with ſo ſmall a quantity as eight grains of gold, may be drawn out to a length of thirteen thouſand feet, the whole ſurface of it ſtill remaining covered with gold. We have alſo a ſurpriſing inſtance of the minuteneſs of ſome parts of matter from the nature of light and viſion. Let a candle be lighted, and placed in an open plane, it will then be viſible two miles round, and conſequently was it placed two miles above the ſurface of the earth, it would fill with luminous particles a ſphere whoſe diameter was four miles, and that before it had loſt any ſenſible part of its weight. A quantity of vitriol being diſſolved, and mixed with nine thouſand times as much water, will tinge the whole, conſequently will be divided into as many parts as there are viſible portions of matter in that quantity of water. There are perfumes which without a ſenſible diminution of their quantity, ſhall fill a very large ſpace with their odoriferous particles, which muſt therefore be of an inconceivable ſmallneſs, ſince there will be a ſufficient number in every part of that ſpace, ſenſibly to affect the organ of ſmelling. Dr. Keill demonſtrates that any particle of matter how ſmall ſoever, and any finite ſpace how large ſoever being given, it is poſſible for that ſmall particle of matter to be diffuſed through all that ſpace, and to fill it in ſuch a manner, as that there ſhall be no pore in it whoſe diameter ſhall exceed any given line. See EFFLUVIUM.

The chief objections againſt the diviſibility of matter in infinitum are, that an infinite cannot be contained by a finite, and that it follows from a diviſibility in infinitum either that all bodies are equal, or that one infinite is greater than another. But the anſwer to theſe is eaſy, for the properties of a determined quantity are not to be attributed to an infinite conſidered in a general ſenſe; and who has ever proved that there could not be an infinite number of infinitely ſmall parts in a finite quantity; or that all infinites are equal? The contrary is demonſtrated by mathematicians in innumerable inſtances. See the article INFINITE, and 'S Graveſande, Elem. Mathem. lib. 1. cap. iv.

DIVISION, in general, is the ſeparating a thing into two or more parts.

DIVISION, in arithmetic, one of the four fundamental rules, whereby we find how often a leſs number, called the diviſor, is contained in a greater, called the dividend; the number of times which the diviſor is contained in the dividend being termed the quotient.

In effect, diviſion is only a compendious ſubſtraction; for ſince the diviſor is ſo many times contained in the dividend as there are units in the quotient, if we ſubſtract the former from the latter as many times as poſſible, the ſum of theſe ſubſtractions will be equal to the quotient. To perform this operation with expedition, one ought to be previouſly well acquainted with the table of multiplication: thus, if I know that 5 × 5 = 25, it will be eaſy for me to ſay how many times 5 is contained in 25; and ſo in other inſtances, where the dividend does not exceed the ſquare of the diviſor. But where this is the caſe, we muſt follow a different method, which is this: ſet down the diviſor firſt, and then the dividend, both in the ſame line, but with a ſtroke of your pen between them, as in the example in the margin; then beginning from the left hand, ſet a dot under that part of the dividend in which the diviſor can be found; which is the figure 7, wherein the diviſor 6 is found 1: place this 1 after the dividend, only with a ſtroke between them, and it will make the firſt figure

```
diviſ. divid.  quot.
   6)  7284   (1214
       ....
       6
       —
       12
       12
       —
        8
        6
        —
        24
        24
```

figure of the quotient: you muſt next multiply the diviſor by this number, *viz.* 6 × 1, and ſubſtract the product from 7, and there will remain 1; after which place the next figure of the dividend, *viz.* 2, marking it with a dot, that you may know how many figures of the dividend are taken down. Find how many times the diviſor is contained in theſe two figures, *viz.* 12, which is twice exactly: place this 2 in the quotient after the former one, 1; and then multiplying and ſubſtracting, you will find no remainder. However, taking down and dotting the next figure of the dividend, *viz.* 8, you will find 6 only once in it; place this 1 in the quotient, and multiplying and ſubſtracting as formerly, there will remain 2; after which place the laſt figure of the dividend, which is alſo to be dotted, and you will have 24, wherein 6 is contained juſt 4 times; place this 4 in the quotient, and the operation is finiſhed. Hence it appears that the diviſor 6 is contained in the dividend 7284 juſt 1214 times, as expreſſed in the quotient.

The method is much the ſame, when there are ſeveral figures in the diviſor: thus, in the example annexed, as 54 is not contained once in 2 or 24, we muſt take down three figures, *viz.* 240, and the firſt dot is to be placed under the 0. We then proceed, and find 54 contained in 240 four times: this 4 we place in the quotient, and multiplping the diviſor 54 by it, and ſubſtracting the product, *viz.* 216 from 240, there remains 24. After this place the next figure of the dividend, *viz.* 8, and the ſum is 248, in which 54 is found 4 times. Multiply and ſubſtract as formerly, and there will remain 32; after which placing the laſt figure of the quotient, *viz.* 4, you will have the ſum 324, in which 54 is found juſt 6 times. So that the diviſor 54 is contained in the dividend 24084 exactly 446 times, as expreſſed in the quotient.

$$\begin{array}{r}
54)\,24\underset{\cdot}{0}\underset{\cdot}{8}\underset{\cdot}{4}\,(446 \\
216 \\
\hline
248 \\
216 \\
\hline
324 \\
234 \\
\hline
\end{array}$$

DIVISION *of fractions.* See the articles DECIMAL and FRACTION.

DIVISION, in algebra, is performed by placing the dividend above a ſmall line, and the diviſor under it; expunging any letters that may be found in all the quantities of the dividend and diviſor, and dividing the co-efficients of all the terms by any common meaſure. Thus, if $10ab+15ac$, is to be divided by $20ad$, they are firſt placed in this manner, $\frac{10ab+15ac}{20ad}$; which after expunging the letter a out of all the terms, and dividing all the co-efficients by 5, is reduced to $\frac{2b+3c}{4d}$. In the ſame manner $2b)\,ab+bb=\frac{ab+bb}{2b}=\frac{a+b}{2}$. Again, $12ab)\,30ax-54ay=\frac{30ax-54ay}{12ab}=\frac{5x-9y}{2b}$; and $4aa)\,8ab+6ac=\frac{8ab+6ac}{4aa}=\frac{4b+3c}{2a}$; and, to add no more, $2bc)\,5abc=\frac{5abc}{2bc}=\frac{5a}{2}$.

With reſpect to the ſigns, if thoſe of the diviſor and dividend be like, the ſign of the quotient muſt be +; but if they are unlike, the ſign muſt be −.

Powers of the ſame root, are divided by ſubſtracting their exponents, as they are multiplied by adding them. Thus if a^5 be divided by a^2, the quotient is $a^{5-2}=a^3$; and b^8 divided by b^2, gives the quotient $b^{8-2}=b^6$; and ſo in other caſes.

If the quantity to be divided is compound, then its parts muſt be ranged according to the dimenſions of ſome one of its letters as in the following example. In the dividend $a^2+2ab+b^2$, they are ranged according to the dimenſions of a, the quantity a^2, where a is of two dimenſions, being placed firſt; $2ab$, where it is of one dimenſion, next; and b^2, where a is not to be found, laſt. The diviſor $a+b$ being ranged in the ſame manner, you are to divide the firſt term of the dividend by the firſt term of the diviſor; and after ſetting down the quotient, which in this caſe is a, multiply this quotient by the whole diviſor, and ſubſtract the product, *viz.* a^2+ab from the two firſt terms of the dividend a^2+2ab, and the remainder ab, together with the laſt term b^2, gives a new dividend $ab+b^2$. Divide the firſt term of this new dividend, by the firſt term of the diviſor, and ſet down the quotient, which in this example is b; then multiplying the whole diviſor by this part of the quotient, ſubſtract the

$$\begin{array}{r}
a+b)\,a^2+2ab+b^2\,(a+b \\
a^2+ab \\
\hline
ab+b^2 \\
ab+b^2 \\
\hline
0\quad 0
\end{array}$$

the product from the new dividend; and if there is no remainder, as is the caſe here, the diviſion is finiſhed. If there is a remainder, you are to proceed after the ſame manner till no remainder is left, or till it appear that there will always be ſome remainder, as in the annexed examples.

Example I. without any remainder.

$$\begin{array}{l} 3a-6)\ 6a^4-96\ (2a^3+4a^2+8a+16 \\ \quad 6a^4-12a^3 \\ \hline \qquad 12a^3-96 \\ \qquad 12a^3-24a^2 \\ \hline \qquad\qquad 24a^2-96 \\ \qquad\qquad 24a^2-48a \\ \hline \qquad\qquad\qquad 48a-96 \\ \qquad\qquad\qquad 48a-96 \\ \hline \qquad\qquad\qquad\ \ 0 \qquad 0 \end{array}$$

Example II. with a remainder.

$$\begin{array}{l} a+x)\,a^2+x^2\,(a-x+\frac{2x^2}{a}-\frac{2x^3}{a^2}+\frac{2x^4}{a^3}\ \&c. \\ \quad a^2+ax \\ \hline \qquad -ax+x^2 \\ \qquad -ax-x^2 \\ \hline \qquad\qquad +2x^2 \\ \qquad\qquad +2x^2+\frac{2x^3}{a} \\ \hline \qquad\qquad\qquad -\frac{2x^3}{a} \\ \qquad\qquad\qquad -\frac{2x^3}{a}-\frac{2x^4}{a^2} \\ \hline \qquad\qquad\qquad\qquad +\frac{2x^4}{a^2},\ \&c. \end{array}$$

In this laſt example, the ſigns are alternately + and —, the co-efficient is conſtantly 2, after the two firſt terms, and the letters are powers of x and a; ſo that the quotient may be continued as far as you pleaſe, without any farther diviſion. But in common examples of diviſion, after you come to a remainder of one term, as $2x^2$, it is uſually ſet down in the quotient, with the diviſor under it, after the other terms; and the quotient in the laſt example will ſtand thus, $a-x+\frac{2x^2}{a+x}$.

As for the other ſigns of diviſion, ſee the article CHARACTER.

DIVISION, among logicians, is the explication of a complex idea, by enumerating the ſimple ideas whereof it is compoſed; in which ſenſe it is nearly allied to definition, only that this laſt regards names and things, whereas diviſion is employed wholly about ideas. When the parts of an idea are divided, in order to a clearer explication of the whole, this is called a ſubdiviſion: thus, a year is divided into twelve months, a month is ſubdivided into weeks, weeks into days, days into hours, and ſo on.

The rules for a good diviſion are theſe, that the members entirely exhauſt the whole; that they be oppoſite; that ſubdiviſions be not too numerous; that the whole be firſt divided into its larger parts, and theſe into the more remote and minute parts.

DIVISION, in natural philoſophy, is the taking a thing to pieces, that we may have a more complete conception of the whole: this is frequently neceſſary in examining very complex beings, the ſeveral parts of which cannot be ſurveyed at one view. Thus, to learn the nature of a watch, the workman takes it to pieces, and ſhews us the ſpring, wheels, axles, pinions, ballances, dial-plate, pointer, caſe, &c. and after deſcribing the uſes and figures of each of them apart, explains how they contribute to form the whole machine.

DIVISION, in muſic, the dividing the interval of an octave, into a number of leſs intervals. See OCTAVE.

The fourth and fifth divide the octave perfectly, though differently: when the fifth is below, and ſerves as a baſs to the fourth, the diviſion is called harmonical; but when the fourth is below, it is called arithmetical.

To run a diviſion, is to play, or ſing, after the manner above-mentioned; that is, to divide the intervals of an octave, fifth, fourth, &c. into as many parts, and as agreeably as poſſible, which depends intirely upon taſte and fancy.

DIVISION, in rhetoric, the arrangement of a diſcourſe under ſeveral heads, each of which is to be ſeparately ſpoken to.

DIVISION *of proportion.* If four quantities be proportional, $a : b : : c : d$; then the aſſumption of the difference between the antecedent $a-b$, or $b-a$, to either the antecedent a, or conſequent b, of the firſt ratio a to b; and the difference between the antecedents $c-d$ or $d-c$ to either the antecedent b, or conſequent d of the ſecond ratio c to d; is called diviſion of proportion. See PROPORTION.

DIVISIONS *of a battalion,* are the ſeveral parcels into which a battalion is divided in marching. The lieutenants and enſigns march before the diviſions.

DIVISION, in the ſea-language, the third part of a fleet of men of war, and ſometimes the ninth part: which laſt happens when the fleet is divided into three ſquadrons: for then each ſquadron is diſtributed into three diviſions. In a ſea-engagement, the order of battle is to place all the ſquadrons, and all the diviſions of each ſide, in one line. This order is kept as long as the wind, and other circumſtances will permit.

IVISOR, in arithmetic, the number that divides another, called the dividend; or, which ſhews into how many parts the dividend is to be divided. See DIVISION.

IUL, a port-town of Aſia, ſituated on the indian ocean, weſtward of the river Indus, and ſixty miles weſt of the city of Tatta: eaſt lon. 67°, and north lat. 25° 15′.

IVORCE, a breach or diſſolution of the bond of marriage. See MARRIAGE.

The uſual divorces, among us, are of two kinds, *viz.* *a menſa & thoro*, from bed and board, and *a vinclo matrimonii*, from the bond or tie of marriage. That *a menſa & thoro*, does not diſſolve the marriage; ſince the cauſe thereof is ſubſequent to it, and, at the ſame time, ſuppoſes the marriage to be lawful: and this divorce may be on account of adultery in either of the parties, for cruelty of the huſband, *&c.* As this divorce diſſolves not the marriage, it does not debar the woman of her dower, nor baſtardize her iſſue, or make void any eſtate for the life of the huſband and wife, *&c.* A divorce *a vinclo matrimonii* entirely diſſolves the marriage, as a pre-contract with ſome other perſon, conſanguinity, or affinity, within the levitical degrees, impotency, impuberty, *&c.* The conſequences attending this laſt divorce are, that the dower is gone thereby, and the children begotten between the parties divorced are baſtards: but here, it is ſaid, the wife ſhall receive all again that ſhe brought with her; becauſe the nullity of the marriage ariſes from ſome impediment, and the goods of the wife were given for her advancement in marriage, which now ceaſes: yet this is when the goods are not ſpent; for if the huſband gives them away during the coverture, without any colluſion, it ſhall be binding to her. A divorce remains good ſo long as the ſentence continues, and iſſue of a ſecond marriage ſhall inherit lands until ſuch ſentence is repealed. See BASTARD.

On the divorce *a vinclo, &c.* the parties are at liberty to marry again; and in divorces for adultery, ſeveral acts of parliament have allowed the innocent party marriage with another perſon. Divorces are only to be had by conſent of parliament.

Among the Hebrews, divorce was made for the advantage of the wives, that they might not be diſcharged nor turned out of doors at pleaſure: it was neceſſary that a bill of divorce ſhould be executed in form by the huſband: the wife was obliged to remain ninety days after the divorce, before ſhe married again, that it might be known, if ſhe proved with child, whoſe it was. The firſt huſband was never allowed to marry her again, after being married, or even contracted, to another; otherwiſe he might. The mahometans, uſually fond of copying after the jews, differ from them in this particular, allowing a man to take his wife again, though he had divorced her three times. It is obſerved, that the women among the Jews, in the latter time of their government, took the ſame liberty as the men, and divorced their jealous and diſagreeable huſbands.

The grecian laws concerning divorces, were different: ſome permitted men to put away their wives on ſlight occaſions: the Cretans allowed it to any man that was afraid of having too great a number of children. The Athenians likewiſe did it upon very ſmall grounds, but not without giving a bill, wherein was contained the reaſons of the divorce, to be approved, if the party divorced made an appeal to the chief magiſtrate. The Spartans, though marrying without much nicety in choice, ſeldom divorced their wives. At Athens, perſons that divorced their wives, were obliged to return their portions, or to pay them an alimony: here a woman might alſo ſue for a divorce. The diſtinction of *repudium* and *divortium*, among the Romans, was owing to the nicety of their lawyers: the firſt they made the breaking of a contract; the laſt a ſeparation after actual matrimony. By the laws of Romulus, a man was at liberty to leave his wife, but not a wife to leave her huſband. The man might divorce his wife, either upon poiſoning her children, counterfeiting his private keys, or for the crime of adultery: but if he put her away upon any other occaſion, one moiety of his eſtate was to be given to his wife, and the other was to fall to the goddeſs Ceres.

DIURESIS, in medicine, an excretion of urine; whence

DIURETICS, in pharmacy, ſuch ſimples as increaſe the diſcharge of urine; or which are ſuppoſed to have a power of removing obſtructions in the urinary paſſages. Diuretics muſt increaſe the liquor to be ſecreted in the proper glandules, and are of the five following kinds: the firſt contains all relaxing and emollient decoctions, emulſions, *&c.* which do not ſtimulate, but only remove obſtructions, by relaxing the veſſels. The ſecond comprehends all thoſe which diſſolve and dilute the blood. The third contains three kinds of medicine. 1. All acids which ſtimulate the veſſels. 2. All ſaline bodies. 3. All fixed and volatile ſalts. The fourth takes in all that preſerve a moderate heat of the body, without ſweat. The fifth claſs contains thoſe whoſe effects diſcover themſelves about the kidneys and bladder; alſo all acrid and ſolvent diuretics.

DIURNAL, in aſtronomy, ſomething relating to the day, in oppoſition to nocturnal, which regards the night.

DIURNAL ARCH, the arch or number of degrees that the ſun, moon, or ſtars deſcribe between their riſing and ſetting.

DIURNAL CIRCLE. See CIRCLE.

DIURNAL *motion of a planet*, is ſo many degrees and minutes as any planet moves in twenty-four hours. Hence the motion of the earth about its axis, is called its diurnal motion. See EARTH.

DIURNAL is alſo uſed in ſpeaking of what belongs to the nycthemeron, or natural day of twenty-four hours, in oppoſition to annual, menſtrual, *&c.* The diurnal phænomena of the heavenly bodies, ariſe from the motion of the earth round its axis. For ſince the earth turns round its own axis from weſt to eaſt, every ſpectator on its ſurface muſt neceſſarily be carried round it the ſame way; and conſequently thoſe parts of the heavens which lie hid towards the eaſt, will by and by come into his ſight, and thoſe which are viſible to him, will depart out of it towards the weſt. From hence it is that the ſpectator not being ſenſible of his own motion (the reaſon of which is, becauſe all things about him move along with him) imagines the whole heavens to turn round the contrary way, *viz.* from eaſt to weſt every twenty-four hours, which is nearly the time in which the earth performs one revolution about its axis. This may be illuſtrated in the following manner.

Let the circle STV (plate LXXV. fig. 3.) repreſent the earth; S, the place of the ſpectator; ABC, ſo much of the heavens as is viſible to him in that ſituation; and let A be the place of the ſun, or any other of the heavenly bodies. When S, the place of the ſpectator, is carried by the rotation of the earth about its axis to T, the viſible part of the heavens will become BAD; and the point A, which before was juſt at one edge of the viſible portion of the heavens, is now in the midſt of it, or directly over the ſpectator's head. Again, when the ſpectator is got to V, the viſible part of the heavens is become ADX, and the point A is got to the other extremity of it, and juſt ready to diſappear; after which it is ſeen no more till the ſpectator arrives at the point S again. From this motion of the earth ariſes that apparent revolution of the planets and fixed ſtars once in twenty-four hours, as alſo that of the ſun, and therewith the ſucceſſion of day and night. See the article EARTH.

DIURNARY, *diurnarius*, an officer in the greek empire, who wrote down in a book, kept for that purpoſe, whatever the prince did, or ordered, *&c.* every day.

DIVUS and DIVA, in antiquity, appellations given to men and women who had been deified. See APOTHEOSIS.

We find this title on medals ſtruck for the conſecration of an emperor or empreſs: thus, DIVVS IVLIVS, DIVA FAVSTINA AVG. *&c.*

DIXMUDE, a town of Flanders, ſituated on the river Ypres, about eleven miles north of the city of Ypres, and thirty-three weſt of Ghent: eaſt long. 2° 40′, and north lat. 51°.

DIZIER, or St. DIZIER, a city of Champaigne, in France, ſituated on the river Marne, about forty-five miles north-eaſt of Troyes: eaſt long. 5°, and north lat. 48° 32′.

DIZZINESS, in medicine, a diſeaſe of the head, called by phyſicians vertigo. See the article VERTIGO.

DO, in muſic, a note of the italian ſcale, correſponding to *ut* of the common gamut. See the article GAMUT.

DOB-CHICK, in ornithology, the engliſh name of the colymbus minor. See the article COLYMBUS.

It is a pretty little bird, ſmaller than the common teal; and, as it is ſeen ſwimming, appears like the young of ſome of the duck-kind; not yet fledged or feathered. But what is moſt ſingular in it, is, its having abſolutely no tail. See plate LXXV. fig. 4. n° 1.

There are ſeveral other ſpecies of this bird, one of the moſt elegant of which is the eared dob-chick, of a blackiſh brown on the upper part of the back, except the ridge thereof, which is white; the ears are formed of a tuft of looſe, long, and reddiſh feathers. *Ibid.* n° 2.

DOCIMASIA, in greek antiquity, a probation of the magiſtrates and perſons employed in public buſineſs at Athens. It was performed publickly in the forum, where they were obliged to give account of themſelves and their paſt life before certain judges. Among ſeveral queſtions propoſed to them, we find the following, whether they had been dutiful to their parents, had ſerved in the wars, and had a competent eſtate.

DOCK, *lapathum*, in botany and medicine. See LAPATHUM.

DOCK, or DOCKING, in law, an expedient for cutting off an eſtate-tail in lands or tenements that the owner may be enabled to ſell, give, or bequeath the ſame.

DOCK, in maritime affairs, is a pit, great pond, or creek, by the ſide of an harbour, made convenient either for the building or repairing of ſhips. It is of two ſorts, 1. Dry-dock, where the water is kept out by great flood-gates, till the ſhip is built or repaired, when the gates are opened, and the water let in to float and launch her. 2. Wet-dock, a place where the ſhip may be hauled into, out of the tide's way, and ſo dock herſelf, or ſink herſelf a place to lie in.

DOCK, in the manege, called by the French trouſſequeue, is a large caſe of leather, as long as the dock of a horſe's tail, which covers the tails of leaping horſes. It is made faſt by ſtraps to the crupper, and has leathern thongs that paſs between his thighs, and along the flanks to the ſaddle-ſtraps, in order to keep the tail tight, and to hinder it to whiſk about, or make the horſe appear broader at the croupe.

DOCK, among ſportſmen, the fleſhy part of a boar's chine, between the middle and the buttocks.

DOCK YARDS, in ſhip-building, are magazines of all ſorts of naval ſtores. The principal ones in England are thoſe of Chatham, Portſmouth, Plymouth, Woolwich, Deptford, and Sheerneſs. In time of peace, ſhips of war are laid up in theſe docks; thoſe of the firſt rates moſtly at Chatham, where, and at other yards, they receive from time to time ſuch repairs as are neceſſary. Theſe yards are generally ſupplied from the northern crowns with hemp, pitch, tar, roſin, &c. but as for maſts, particularly thoſe of the larger ſize, they are brought from New England.

How much it imports the good of the public to keep theſe magazines conſtantly repleniſhed, every one is able to judge: and it were to be wiſhed the improving the before-mentioned commodities, in our engliſh plantations, might meet with all poſſible encouragement, leſt, one time or other, it may prove difficult to get them elſewhere.

DOCKET, a little bill tied to wares or goods, directed to the perſon or place they are to be ſent to.

DOCKET, or DOGGET, in law, ſignifies a brief in writing, made on a ſmall piece of paper, or parchment, containing the purport and effect of a large writing. The rolls of judgment, when brought into the court of common pleas, are entered on the docket of that term: and attorneys keep docket-books, wherein they enter judgments.

DOCTOR, a perſon who has paſſed all the degrees of a faculty, and is impowered to teach or practiſe the ſame: thus we ſay, doctor in divinity, doctor in phyſic, doctor of laws.

The title of doctor ſeems to have been created in the XIIth century, inſtead of *maſter*, and eſtabliſhed with the other ſcholaſtic degrees of batchelors and licentiates, by Peter Lombard and Gilbert Porreus, then the chief divines of the univerſity of Paris. Gratian did the ſame thing, at the ſame time, in the univerſity of Bologna. Though the two names of *doctor* and *maſter* were uſed a long time together, yet many think that their functions were different, the maſters teaching the human ſciences, and the doctors thoſe ſciences depending on revelation and faith. Spelman takes the title of doctor not to have commenced till after the publication of Lombard's Sentences, about the year 1140, and affirms that ſuch as explained that work to their ſcholars were the firſt that had the appellation of doctors.

To paſs doctor in divinity at Oxford, it is neceſſary the candidate have been four years batchelor of divinity. For doctor of laws, he muſt have been ſeven years in the univerſity to commence batchelor of law, five years after which he may be admitted doctor of laws. Otherwiſe in three years after taking the degree of maſter of arts, he may take the degree of batchelor in laws, and in four years more that of doctor: which ſame method and time are likewiſe required to paſs the degree of doctor in phyſic. At Cambridge, to take the degree of doctor in divinity, it is required the candidate have been ſeven years batchelor of divinity: though in ſeveral colleges the batchelor's degree is diſpenſed with, and they may go out *per ſaltum*. To commence doctor in laws, the candidate muſt have been five years batchelor of laws, or ſeven years maſter of arts. To paſs doctor in phyſic, he muſt have been batchelor in phyſic five years, or ſeven years maſter of arts. It is remarkable, that by a ſtatute of 37 Hen. VIII. a doctor of civil law may exerciſe eccleſiaſtical juriſdiction, though a layman.

DOCTOR, is alſo an appellation adjoined to ſeveral ſpecific epithets, expreſſing the merit of ſome of the ſchoolmen: thus Alexander Hales is called the irrefragable doctor; Thomas Aquinas, the angelic doctor; St. Bonaventure, the ſeraphic doctor; John Duns Scotus, the ſubtile doctor; Raimond Lully, the illuminated doctor; Roger Bacon, the admirable doctor, *&c.*

DOCTOR *of the church*, a title given to certain of the fathers, whoſe doctrines have been moſt generally received: of theſe are uſually reckoned four in the greek church, *viz.* St. Athanaſius, St. Baſil, St. Gregory Nazianzen, and St. Chryſoſtom: and three in the latin church, namely, St. Jerom, St. Auguſtine, and Gregory the great.

DOCTOR, διδασκαλος, in the greek church, is a particular officer appointed to interpret part of the ſcripture. He who explains the goſpels is called doctor of the goſpels; he who explains St. Paul's Epiſtles, doctor of the apoſtle; and he who interprets the Pſalms, doctor of the pſalter. The grecian biſhops ſtill confer thoſe ſort of offices by impoſition of hands, as it is practiſed in ordinations.

DOCTOR *of the law*, a title of honour among the Jews. The inveſtiture, if we may ſo ſay, of this order was performed by putting a key and a table-book in their hands, which is what ſome authors imagine our Saviour had in view, Luke xi. 52. when ſpeaking of the doctors of the law, he ſays, "Woe unto you, doctors of the law, for you have taken away the key of knowledge: you entered not in yourſelves, and them that were entering you hindered." The greek text of St. Luke calls them νομικοι, and the vulgate *legis periti*: agreeably to which our engliſh tranſlators call them *lawyers*. The word νομικος, however, in St, Matt. is rendered by the vulgate *legis doctor*, though the engliſh verſion ſtill retains the word *lawyer*.

Theſe jewiſh doctors are otherwiſe called rabbins. See the article RABBI.

DOCTORS COMMOMS. See COLLEGE *of civilians*.

DOCUMENT, in law, ſome written monument produced in proof of any thing aſſerted.

DODARTIA, in botany, a genus of the didynamia-angioſpermia claſs of plants, the flower of which conſiſts of one ringent petal, with the upper lip erect and ſemibifid; and the lower lip patent, twice broader than long, and trifid: the fruit is a globoſe bilocular capſule, containing a great number of very ſmall ſeeds. See plate LXXVI. fig. 1.

DODDER, the engliſh name of a plant, called by authors cuſcuta. See the article CUSCUTA.

DODECAGON, in geometry, a regular polygon conſiſting of twelve equal ſides and angles.

Dodecagon, in fortification, is a place ſurrounded by twelve baſtions.

DODECAHEDRON, in geometry, one of the platonic bodies, or regular ſolids, contained under twelve equal and regular pentagons.

Its ſolidity is found by multiplying the area of one of the pantagons by 12, and then this product by $\frac{1}{3}$ of the diſtance of the face from the center of the dodecahedron, which is the ſame with the center of the circumſcribing ſphere.

The ſide of a dodecahedron, inſcribed in a ſphere, is the greater part of the ſide of a cube, inſcribed in the ſame ſphere, cut into extreme and mean proportion. If the diameter of the ſphere be 1.0000, the ſide of the dodecahedron, inſcribed in it, will be .35682 nearly.

All dodecahedrons are ſimilar, and are to one another as the cubes of their ſides; their ſurfaces are alſo ſimilar, and therefore they are as the ſquares of their ſides; whence as .509282 is to 10.51462, ſo is the ſquare of the ſide of any dodecahedron to the ſuperficies thereof; and as .3637 is to 2.78516, ſo is the cube of the ſide of any dodecahedron to the ſolidity of it.

DODECANDRIA, in the linnæan ſyſtem of botany, a claſs of plants, the eleventh in order, comprehending all thoſe with hermaphrodite flowers, and only twelve ſtamina in each: ſuch are agrimony, aſarum, rhizophora, *&c.*

DODECATEMORY, an appellation given to each of the twelve ſigns of the zodiac, becauſe they contain a twelfth part of the zodiac apiece. See SIGN.

It is alſo applied to the twelve houſes or parts of the zodiac of the primum mobile, to diſtinguiſh them from the twelve ſigns. See the article HOUSE.

DODECATHEON, in botany, a genus of the pentandria-monogynia claſs of plants, the calyx of which is a very ſmall involucrum, conſiſting of a great many leaves and flowers; the corolla conſiſts of a ſingle petal, divided into five ſegments: the fruit is an oval, oblong capſule, containing one cell; the ſeeds are numerous and ſmall.

DODECUPLA DI CROME, in the italian muſic, a name given to the triple $\frac{12}{8}$, in four of which twelve notes are required, inſtead of four in common time.

DODECUPLA DI SEMI CROME, is our triple $\frac{12}{16}$, wherein there are twelve notes inſtead of ſixteen, in a bar of duple time.

DODO, in ornithology, a large exotic bird, ſuppoſed to belong to the ſwan kind, only ſomewhat bigger than the common ſwans: add to this, that its head is covered with a membrane reſembling a hood. See plate LXXVI. fig. 2.

DODONIAN, *dodonæus*, in antiquity, an epithet given to Jupiter, becauſe he was worſhipped in a temple built in the foreſt of Dodona, where was the moſt famous and it is ſaid the moſt antient oracle of all Greece. It is reported that the pigeons and the very oaks of the foreſt of Dodona ſpoke and delivered oracles. In the temple was a fountain, which the antient naturaliſts aſſure us had a property of rekindling torches when newly extinguiſhed. It is alſo ſaid to have extinguiſhed lighted torches, which is no great miracle, ſince plunging them into a place where the air was too denſe, or into the water, muſt neceſſarily have that effect.

DODRANS, in antiquity, three fourths of the as. See the article As.

DOESBURG, a town of the United Netherlands, in the province of Guelderland, ſituated on the river Yſſel, about nine miles ſouth of Zutphen: eaſt long. 6°, and north lat. 52°.

DOFRINE MOUNTAINS, thoſe which divide Sweden from Norway.

DOG, *canis*, in zoology, a genus of quadrupeds. See the article CANIS.

The dog, in its wild ſtate, lives comfortably in the woods, in many parts of the eaſt: it does not attack a man, but neither does it diſcover any of that familiarity which we find in the tame ones; and indeed many other animals may be made as tame as the dog, by the ſame kind of treatment, which has been tried on the otter with ſucceſs.

Authors have mentioned a great many ſpecies of this animal, as the maſtiff, wolf-dog, greyhound, hound, ſpaniel, water-ſpaniel, bull-dog, lap-dog, *&c.* but all theſe are only varieties of the original wild kind, which is of a middle ſize between the maſtiff and greyhound.

Chooſing of DOGS. In order to chooſe a dog and bitch for good whelps, take care that the bitch come of a generous kind, be well proportioned, having large ribs and flanks, and likewiſe that the dog be of a good breed and young. Hounds for chace are to be choſen by their colours; the white with black ears and a black ſpot at the ſetting on of the tail, are the beſt to compoſe a kennel of, and of good ſcent. The black hound, or the black tanned, or the liver-coloured or white; the true talbots, are the beſt for the ſtronger line: the grizel, whether mixed or unmixed, ſo they be ſhag-haired, are the beſt verminers, and a couple of theſe are proper for a kennel. In ſhort, take theſe marks of a good hound, that his head be of a middle proportion, rather long than round; his noſtrils wide; the ears large; his back ſowed; his fillet great; haunches large; thighs well truſſed; ham ſtraight; tail big near the reins, the reſt being ſlender; the leg big; the ſole of the foot dry, and in the form of that of a fox with large claws.

Setting DOG. See SETTING DOG.

Bite of a mad DOG, in medicine. See the article HYDROPHOBIA.

DOG, *canis*, in aſtronomy. See CANIS.

DOG'S BANE, *apocynum*, in botany, a genus of the pentandria digynia claſs of plants, the corolla of which conſiſts of a campanulated, roundiſh, ſingle petal, lightly divided into five ſegments, which are revolute: there is no other nectarium; the fruit is compoſed of oblong, acuminated follicles, each formed of two valves and containing one cell; the ſeeds are numerous, very ſmall, and coronated with long down.

DOG-DAYS, the ſame with thoſe called canicular. See CANICULAR DAYS.

DOG-DRAW, a term in the foreſt-law, uſed when a man is found drawing after a deer, by the ſcent of a hound which he leads in his hand.

DOG'S FENNEL, in botany, a name by which the cotula is ſometimes called. See the article COTULA.

DOG FLY, *cynomuia*, a kind of fly ſo called from its being particularly troubleſome to dogs: it is not unlike that ſpecies which infeſts cattle.

DOG'S STONES, a ſpecies of orchis, ſaid to be a great provocative to venery.

DOG'S TAIL, in botany, the ſame with the cynoſurus. See CYNOSURUS.

DOG'S TONGUE, a plant called by botaniſts cynogloſſum. See CYNOGLOSSUM.

DOG'S TOOTH VIOLET, *dens canis*, a plant called by Linnæus, erythronium. See the article ERYTHRONIUM.

DOG'S TOOTH SHELL, the ſame with the dentalium. See DENTALIUM.

DOGADO, a dutchy of Italy, of which Venice is the capital. See VENICE.

DOGE, the chief magiſtrate in the republics of Venice and Genoa.

This dignity is elective in both places: at Venice it continues for life, at Genoa it is only for two years. His title is ſerenity: he is chief of the council, and mouth of the republic, he being to anſwer for her. The Venetians do not go into mourning at his death, being only the phantom of majeſty, as all the authority is veſted in the republic; the doge only lends his name to the ſenate; the power is diffuſed through the whole body, though anſwers to foreign ambaſſadors, *&c.* are made in the name of the doge. The money is ſtruck in his name, but does not bear his arms. All the magiſtrates riſe and ſalute him when he comes into the council: but he riſes to none but foreign ambaſſadors. He muſt not ſtir out of Venice, without leave of the counſellors, *&c.*

DOGGERS, in the alum-works, a poor kind of alum-ore. See ALUM.

DOGGERS is alſo a name uſed for fiſhing veſſels; whence, in ſome of our old ſtatutes, we meet with dogger-men, denoting the fiſhermen of thoſe veſſels.

DOGGS denote iron machines for burning wood on; alſo hooks fixed in large timbers, for drawing them with horſes.

DOGMA, a principle, maxim, tenet, or ſettled opinion, particularly with regard to matters of faith and philoſophy.

DOGMATICAL, ſomething belonging to a doctrine or opinion. A dogmatical philoſopher is one who aſſerts things poſitively; in oppoſition to ſceptic, who doubts of every thing.

DOGMATISTS, *dogmatici*, a ſect of antient phyſicians, of which Hippocrates was the firſt author. They are alſo called *logici*, logicians, from their uſing the rules of logic in ſubjects of their profeſſion. They laid down definitions and diviſions, reducing diſeaſes to certain genera, and thoſe genera to ſpecies, and furniſhing remedies for them all; ſuppoſing principles, drawing concluſions, and applying thoſe principles and concluſions to particular diſeaſes under conſideration: in which ſenſe the dogmatiſts ſtand contradiſtinguiſhed from empirics and methodiſts. They reject all medicinal virtues that they think not reducible to manifeſt qualities: but Galen hath long ago obſerved of ſuch men, that they muſt either deny plain matter of fact, or aſſign but very poor reaſons and cauſes of many effects they pretend to explain.

DOLE, in our antient cuſtoms, ſignified a part, or portion, moſt commonly, of a meadow, where ſeveral perſons have ſhares. It alſo ſtill ſignifies a diſtribution or dealing of alms, or a liberal gift made by a great man to the people.

DOLE-FISH ſeems to be that fiſh which the fiſhermen, yearly employed in the north ſeas, do, of cuſtom, receive for their allowance or ſhares.

DOLE, in the law of Scotland, is uſed for malevolent intention.

Dole, in the law of Scotland, as well as *dolum* in the civil law, from whence it is taken, is an eſſential ingredient to conſtitute an action criminal. In crimes wherein the will, and the event, muſt be regarded, no negligence can equal dole, unleſs the negligence be ſo extremely ſupine as not to be conceivable without implying dole.

Under dole are comprehended the vices, and errors of the will, which are immediately productive of the criminal fact, though not premeditated, but the effect of ſudden paſſion. In this reſpect dole differs from what the engliſh law calls malice. See the article MALICE.

DOLICHOS, in botany, a genus of the diadelphia-decandria claſs of plants, the corolla of which is papilionaceous; the vexillum is roundiſh, large, emarginated, and wholly reflected; the fruit is a large, acuminated, oblong pod, compoſed of two valves, and containing two cells; the ſeeds are numerous, elliptical, and frequently compreſſed.

DOLIMAN, a kind of long caſſock, worn by the Turks, hanging down to the feet, with narrow ſleeves buttoned at the wriſt.

DOLIUM, in natural hiſtory, the name of a genus of ſhells, called by ſome conchæ-globoſæ.

The dolium is a ſimple ſhell, without any hinge, formed of one continuous piece, which makes a body of a figure approaching to round, diſtended, and, as it were, inflated. The animal inhabiting this ſhell is a limax. See the article LIMAX.

Some of theſe have the mouth dentated; others ſmooth; in ſome the clavicle is moderately long, though in moſt it is depreſſed; and the columella is in ſome ſpecies ſmooth, in others wrinkled: theſe ſhells are found on the ſhores of many parts of the Eaſt Indies, and are alſo frequently brought from America. See plate LXXVI. fig, 3.

DOLLAR, a ſilver coin current in ſeveral parts of Germany and Holland. There are various ſpecies of dollars, as the rix-dollar, the ſemi-dollar, the quarter-dollar, *&c.* for each of which ſee COIN.

DOLPHIN, in ichthyology, the engliſh name of the delphinus, with an oblong rounded body, and a long acute roſtrum. It is conſiderably longer than the porpeſſe: the opening of the mouth is vaſtly wide, reaching on each ſide to the breaſt; and the fiſtula, or aperture for diſcharging the water, is in the middle of its head. See plate LXXVI. fig. 4.

DOLPHIN, *delphinus*, in aſtronomy. See the article DELPHINUS.

DOM, or DON, a title of honour, invented and chiefly uſed by the Spaniards, ſignifying ſir, or lord.

This title, it ſeems, was firſt given to Pelayo, in the beginning of the VIIIth century. In Portugal no perſon can aſſume the title of don, without the permiſſion of the king, ſince it is looked upon as a mark of honour and nobility. In France it is ſometimes uſed among the religious. It is an abridgement of *domnus*, from *dominus*.

DOME, in architecture, a ſpherical roof, or a roof of a ſpherical form, raiſed over the middle of a building, as a church, hall, pavilion, veſtible, ſtair-caſe, *&c.* by way of crowning.

Domes are the ſame with what the Italians call cupolas, and we cuppolas: Vitruvius calls them tholi. See CUPOLA, *&c.* They are generally made round, or reſembling the bell of a great clock; but there are ſome inſtances of ſquare ones, as thoſe of the Louvre. Some of them alſo are in the form of polygons, as that of the jeſuit's church in the Rue St. Antoine, at Paris. Domes have commonly columns ranged around their outſides, both for the ſake of ornament and ſupport to the work.

DOMESDAY, or DOOMS-DAY-BOOK, a very antient record made in the time of William the Conqueror, which now remains in the exchequer, and conſiſts of two volumes, a greater and a leſs; the greater contains a ſurvey of all the lands in moſt of the counties in England, and the leſs comprehends ſome counties that were not then ſurveyed. The book of domeſday was begun by five juſtices, aſſigned for that purpoſe in each county, in the year 1081, and finiſhed in 1086. It was of that authority, that the Conqueror himſelf ſubmitted, in ſome caſes wherein he was concerned, to be determined by it. Camden calls this book the Tax book of king William; and it was farther called Magna rolla.

There is likewiſe a third book of Domeſday, made by command of the Conqueror; and alſo a fourth, being an abridgment of the other books.

DOMES-MEN, judges or perſons appointed to determine ſuits and controverſies between parties. See DAY'S MAN.

DOMESTIC, any man who acts under another, ſerving to compoſe his family; in which he lives, or is ſuppoſed to live, as a chaplain, ſecretary, *&c.* Sometimes domeſtic is applied to the wife and children, but very ſeldom to ſervants, ſuch as footmen, lacqueys, porters, *&c.*

DOMESTIC, *domeſticus*, in antiquity, was a particular officer in the court of Conſtantinople.

According to ſome, this officer was one intruſted to manage affairs of importance: others ſay, the greek *domeſtici* were the ſame with the roman *comites*; and that they began firſt to be uſed when count became a dignity; domeſtics therefore were ſuch as ſerved the prince in the adminiſtration of affairs, as well thoſe of the family, as the affairs of juſtice and the church.

DOMESTICUS MENSÆ, officiated as grand ſeneſchal, or ſteward.

DOMESTICUS *rei domeſticæ*, did the office of maſter of the houſhold.

DOMESTICUS SCHOLARUM, or LEGIONUM, commanded the reſerved forces, called ſcholæ palatinæ, whoſe office it was to put the immediate orders of the emperor in execution.

DOMESTICUS MURORUM had the ſuperintendance of all the fortifications.

DOMESTICUS REGIONUM was a ſort of attorney, or ſolicitor-general, of the eaſt and weſt.

DOMESTICUS ICANATORUM commanded the military cohorts. There were ſeveral other officers of the army, who were called by the name Domeſticus, which meant no more than their commander. There were alſo two *domeſtici chori*, or chantors, called alſo *protopſaltes*, belonging to the church at Conſtantinople; one of them was on the right ſide of the church, and the other on the left.

DOMESTICI, was alſo a body of forces in the roman empire.

Pancirollus takes them to be the ſame with thoſe called *protectores*, who had the chief guard of the emperor's perſon, in a degree above the prætorians, and who, under the chriſtian emperors, had the privilege to bear the grand ſtandard of the croſs. They are ſuppoſed to have been 2500 before Juſtinian's time, who added 2000 more to the number. They were divided into ſeveral companies, or bands, called *ſcholæ*. Some whereof are ſaid to have been inſtituted by Gordian: ſome of them were cavalry, and others infantry. Their commander was called *comes domeſticorum*.

DOMESTIC NAVIGATION, coaſting, or ſailing along the ſhore, in which the lead and compaſs are the chief inſtruments.

DOMIFYING, in aſtrology, the dividing or diſtributing the heavens into twelve houſes, in order to erect a theme, or horoſcope, by means of ſix great circles, called circles of poſition.

There are various ways of domifying: that of Regiomontanus, which is the moſt common, makes the circles of poſition paſs through the interſections of the meridian and the horizon: others make them paſs through the poles of the zodiac.

DOMINANT *of a mode*, in muſic, that ſound which makes a perfect fifth to the final in authentic modes; and a third to the final or ſixth, to the loweſt chord of a plagal mode.

DOMINATION, in theology, the fourth order of angels, or bleſſed ſpirits, in the hierarchy, reckoning from the ſeraphim.

DOMINGO, or ST. DOMINGO, the capital of the iſland of Hiſpaniola, the ſee of an archbiſhop, and the moſt antient royal audience in America: weſt long. 70°, north lat. 18° 20′.

DOMINI, or ANNO DOMINI. See the article ANNO.

Bull in cæno DOMINI. See BULL.

DOMINICA, one of the Caribbee-iſlands, ſubject to Britain: weſt long. 61° 20′, north lat. 16°.

DOMINICAL LETTER, in chronology, is that letter of the alphabet which points out in the calendar the Sundays throughout the year, thence alſo called *Sunday-letter*. See CALENDAR and BISSEXTILE.

The diſtribution of days into weeks is made by the ſeven firſt letters of the alphabet, A, B, C, D, E, F, G, beginning, at the firſt of January, to place the letter A; to the ſecond of January B is joined; to the third C; and ſo on to the ſeventh, where G is figured: and then again beginning with A, which is placed at the eighth day, B will be at the ninth, C, at the tenth, and ſo continually repeating the ſeries of theſe ſeven letters, each day of the year has one of them in the calender. By this means the laſt of December has the letter A joined to it, for if the 365 days, which are in a year, be divided by ſeven, we ſhall have fifty-two weeks, and one day over. If there had been no day over, all the years would conſtantly begin on the ſame day of the week, and each day of a month would conſtantly have fallen on the ſame day of the week: but now, on account, that beſides the fifty-two weeks in the year, there is one day more, it happens, that on whatever day of the week the year begins, it ends upon the ſame day, and the next year begins with the following day.

The letters being ranked in this order, that letter which anſwers to the firſt Sunday of January, in a common year, will ſhew all the Sundays throughout the year, and to whatever days in the reſt of the months, that letter is put, theſe days are all Sundays. If the firſt day of January be on a Sunday, the next year will begin on Monday, and the Sunday will fall on the ſeventh day, to which is annexed the letter G, which therefore will be the Sunday letter for that year: the next year beginning on

Tueſday, the firſt Sunday will fall on the ſixth of January, to which is adjoined the letter F, which is the Sunday letter for that year; and in the ſame manner, for the next following, the dominical letter will be E; and ſo on. By this means the Sunday letters will go on in a retrograde order, *viz.* G, F, E, D, C, B, A. But becauſe every fourth year conſiſts of 366 days, the ſeries of letters will be interrupted, and the order will not return till twenty-eight years, or four times ſeven; and hence ariſes the cycle of twenty-eight years. See the article CYCLE *of the Sun.*

Thus, if in a leap year, the firſt of January be Sunday, and conſequently the dominical letter A, the twenty-fourth day of February will fall on a Friday, and the twenty-fifth on a Saturday; and ſince both theſe days are marked in the calendar with the letter F, the following day, which is Sunday, will be marked with G, which letter will mark out all the Sundays, and conſequently be the dominical letter the remaining part of the year; and hence it is that every leap year has two dominical letters, the firſt of which ſerves from the beginning of the year to the twenty-fourth or twenty-fifth day of February, and then the other takes place and ſerves for the reſt of the year.

The intercalary day is placed between the twenty-third and twenty-fourth day of February, and ſo makes two twenty-fourths of February, which in the calendar are eſteemed one and the ſame day, and have the ſame letter affixed to them; but by our way of reckoning, they are called the twenty-fourth and twenty-fifth days of February.

For finding the dominical letter, divide the year, and its fourth part, by ſeven, which will give the index of the dominical letter, reckoning 1 for A, 2 for B, 3 for C, &c.

Thus, if it were required to find the dominical letter for the year 1754, it will be found to be F. For, if to the given year 1754, you add its fourth part 438, the ſum will be 2192, which divided by 7, the remainder will be 1, and that ſubtracted from 7, the index will be 6, which correſponds to the letter F.

But as the years 1800, 1900, 2100, 2200, 2300, &c. according to the new ſtile, conſiſt of 365 days only, and therefore have but one dominical letter, whereas, according to the Julian calendar, they would have two; for this reaſon the dominical letters will be changed, and conſequently this method of finding the dominical letter will only hold good for this century; after which a number muſt be added to the year, and its fourth, in order to find the dominical letter for ever: for which purpoſe obſerve the following rule.

Reject the figures or cyphers to the place of hundreds: divide the remaining figures or cyphers by 4; from this quotient ſubtract 1, and this number ſubtracted from the hundred years; and then this laſt remainder taken from the leaſt number of ſevens poſſible, leaves a number which muſt be added to the year and its fourth, in order to find the dominical letter: Example, what will be the dominical letter for the year 1842? This queſtion, by the above rule, will be ſolved in the following manner, $18 \div 4 = 4$ from which ſubtracting 1; and the remainder 3 taken from 18, gives 15, which being ſubtracted from 21, the neareſt ſevens gives 6, the number to be added. Then to the given year 1842, and its fourth part 460, and the number found 6, the ſum is 2308; which being divided by 7, gives 329 for the quotient, and the remainder is 5; which taken from 7, leaves 2, the index of the letter B, the dominical letter required.

DOMINICANS, an order of religious, called in France, jacobins, and in England, black fryars, or preaching fryars. This order, founded by St. Dominic, a native of Spain, was approved of by Innocent III. in 1215, and confirmed by a bull of Honorius III. in 1216. The deſign of their inſtitution was, to preach the goſpel, convert heretics, defend the faith, and propagate chriſtianity. They embraced the rule of St. Auguſtine, to which they added ſtatutes and conſtitutions, which had formerly been obſerved either by the Carthuſians or Præmonſtratenſes. The principal articles enjoined perpetual ſilence, abſtinence from fleſh at all times, wearing of woollen, rigorous poverty, and ſeveral other auſterities. This order has ſpread into all the parts of the world. It has produced a great number of martyrs, confeſſors, biſhops; and they reckon three popes, ſixty cardinals, 150 archbiſhops, and 800 biſhops of their order, beſides the maſters of the ſacred palace, who have always been dominicans. They are inquiſitors in many places, The nuns or ſiſters of this order, owe their foundation to St. Dominic himſelf, who built a monaſtery at Prouilles, where poor maids might be brought up and ſupplied with all neceſſaries for their ſubſiſtence. The habit of theſe religious was a white robe, a tawney mantle, and a black veil. Their founder obliged them to work at certain hours of the day, and particularly to ſpin yarn and flax to make their own linen. The nuns of this order have 130 houſes in Italy, forty-five in France, fifty in Spain, fifteen in Portugal, forty in Germany, and many in Poland, Ruſſia, and other countries. They lie on ſtraw beds, and never eat fleſh excepting in ſickneſs; but many monaſteries have mitigated this auſterity.

DOMINION, *dominium*, in the civil law ſignifies the power to uſe or diſpoſe of a thing as we pleaſe. *Dominium plenum*, is when the property is united with the poſſeſſion. *Dominium nudum*, when there is the property without the poſſeſſion. *Dominium* is again divided into that which is acquired by the law of nations, and that which is acquired by the civil law. The former can never be got without poſſeſſion, the latter may. Another diſtinction of *dominium* is, into natural and civil. Natural is that which is common to all nations, or that which is acquired by the means which all nations uſe in acquiring eſtates. Civil is peculiar to the roman citizens, and conſiſts of theſe three methods. Sale, preſcription, ceſſion of right. *Directum dominium*, is the right alone of dominion. *Dominium utile*, the profit redounding from it. Thus the wife retains the *dominium directum* of her jointure, and the *dominium utile* paſſes to her huſband.

DOMINUS, in the civil law, he who poſſeſſes any thing by right of purchaſe, gift, loan, legacy, inheritance, payment, contract, or ſentence.

DOMINUS, in the feudal law, he who grants a part of his eſtate in fee to be enjoyed by another.

DOMINUS, in the antient times, a title prefixed to a name, uſually to denote the perſon either a knight or a clergyman.

DOMO REPARANDO, in law, is a writ which lies for a perſon againſt his neighbour, whoſe houſe he fears will fall to the damage of his own.

DON, the name of two rivers; one very large, which after dividing Aſia from Europe, falls into the Palus Meotis; the other, in the county of Aberdeen in Scotland.

DONATION, an act whereby a perſon transfers to another either the property or the uſe of ſome thing, as a free gift. In order to be valid, it ſuppoſes a capacity both in the donor and donee, and requires conſent, acceptance, and delivery; and, by the french law, alſo regiſtry. Civilians diſtinguiſh donation into pure and conditional. *Donatio pura* is when one gives a thing with an intention that it become immediately the property of the donee, never to revert to the donor; and this from no other motive, than his generoſity. *Donatio conditionalis* is when one gives a thing with an intention that it become the property of the donee, upon performing ſome condition ſtipulated.

DONATISTS, chriſtian ſchiſmatics in Africa, who took their name from their leader Donatus. A ſecret hatred againſt Cæcilian, elected biſhop of Carthage about the year 311, excited Donatus to form this ſect. He accuſed Cæcilian of having delivered up the ſacred books to the pagans, and pretended that his election was void, and all his adherents heretics. He taught that baptiſm adminiſtred by heretics was null, that every church but the African was become proſtituted, and that he was to be the reſtorer of religion. Some accuſe the donatiſts of arianiſm. Conſtantius and Honorius made laws for their baniſhment, and Theodoſius and Honorius condemned them to grievous mulcts.

DONATIVE, a gratuity, or preſent made to any perſon.

Donative among the Romans was properly a gift made to the ſoldiers, as congiarium was that made to the people. See the article CONGIARIUM.

Salmaſius ſays, the common and legitimate rate of a donative, was three pieces of gold per head; and Caſaubon obſerves, that the legal donative was 20,000 denarii; and that it was not cuſtomary to give leſs, eſpecially to the prætorian ſoldiers; that the centurions had double, and the tribunes, *&c.* more in proportion.

Donative, in the canon law, is a benefice given by the patron to a prieſt, without preſentation to the ordinary, and without inſtitution or induction. The king may found a church or chapel, and exempt

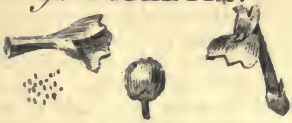


Fig. 1. DODARTIA.

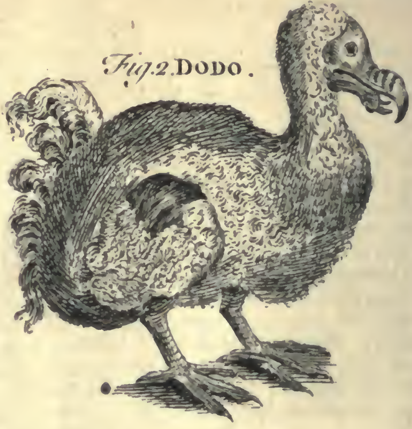


Fig. 2. DODO.

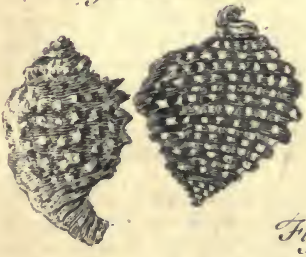


Fig. 3. DOLIUM.

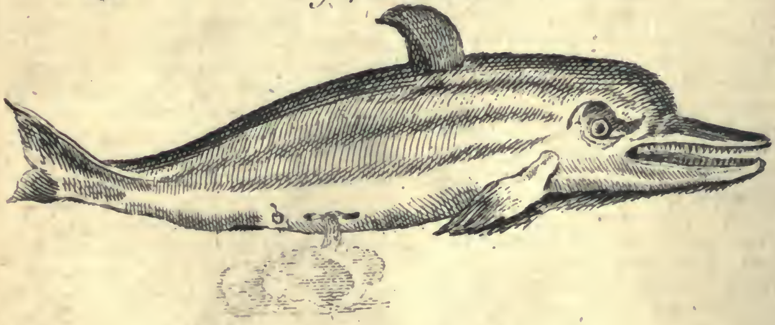


Fig. 4. DOLPHIN.

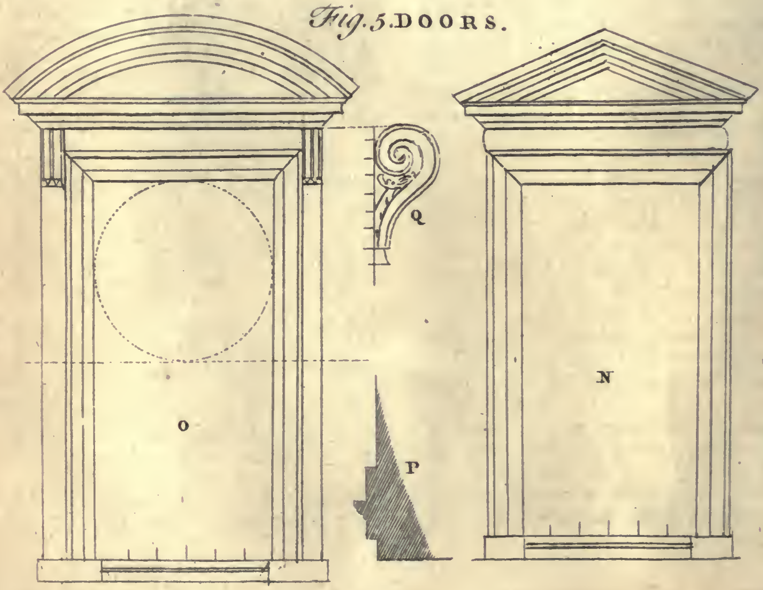


Fig. 5. DOORS.

T. Jefferys sculp

exempt it from the juriſdiction of the ordinary. He may alſo by his letters patent grant licence to a common perſon to found ſuch a church, and ordain it to be made donative. The reſignation of a donative muſt be to the donor or patron, nor may the ordinary viſit the ſame, but the patron by commiſſioners appointed by him. There can be no lapſe of this benefice, though the biſhop may compel ſuch patron to nominate a clerk by eccleſiaſtical cenſures; and the clerk muſt be qualified as other clerks of churches are.

DONAWERT, a city of Bavaria in Germany, forty miles north-weſt of Ulm: eaſt long. 10° 40′ north lat. 48° 40′.

DONCASTER, a market town of Yorkſhire, thirty miles ſouth of York.

DONEE. See the article DONOR.

DONJON, in fortification, ſignifies a ſtrong tower, or redoubt of a fortreſs, whither the garriſon may retreat, in caſe of neceſſity, and capitulate with greater advantage.

DONOR, in law, the perſon who gives lands or tenements to another in tail, *&c.* as he to whom ſuch lands, *&c.* are given is the donee.

DONZY, a town of France in the Orleannois: eaſt long. 3° 16′, north lat. 47° 17′.

DOOR, in architecture, an aperture in a wall, to give entrance and exit into and out of a building, or any apartment thereof.

It is laid down as a rule, that the doors of an houſe be as few in number, and as moderate in dimenſions, as poſſible; as all openings are weakenings.

Secondly, that they do not approach too near the angles of the walls, it being a very great ſoleciſm to weaken that part which ſtrengthens all the reſt.

Thirdly, that the doors, if poſſible, be placed over one another, that void may be over void, and full over full, which circumſtance will greatly ſtrengthen the whole fabric.

Fourthly, that, if poſſible, they may be oppoſite to each other, in ſuch a manner, that one may ſee from one end of the houſe to the other, which will not only be very graceful, but moſt convenient, in reſpect that it affords means of cooling the houſe in ſummer, by letting the air through it, and by keeping out the wind in winter, which way ſoever it ſit.

Fifthly, 'tis not only ornamental, but very ſecure, to turn arches over doors, which will diſcharge them in great meaſure from the ſuperincumbent weight.

The proportions of doors are adjuſted by thoſe of a man. In large buildings, they muſt be always larger than in ſmaller; but ſhould not be leſs than ſix feet high in any, to admit a man of a juſt ſtature erect: and as the breadth of a man, with his arms placed akembo, is nearly ſubduple his height, the width ought never to be leſs than three feet. Some architects give us thoſe dimenſions following: in ſmall buildings, the breadth of the door four feet, or four and a half; in middling buildings five, or ſix; in large ones ſeven, or eight: in chambers of the firſt ſtory three and a half, three and three-fourths, or four; of the ſecond, four, or four and a half; and of the third, five, or ſix; in churches ſeven or eight; in gates, nine, ten, or twelve: hence their height is eaſily determined, except for the gates of cities, which ſhould only be four-fifths of their breadth.

In plate LXXVI. fig. 5. are repreſented two doors, of which that marked N is two diameters high; and that marked O, $2\frac{1}{6}$ diameters. Here the architrave being divided into three parts, two is for the breadth of the pilaſter, as at P; and on theſe pilaſters are placed the truſſes, ſcroles, or corbels, as in Q; whoſe ſhape is almoſt at pleaſure. If either of theſe be uſed as frontiſpieces of external doors, the pediment ought not to be broken, or opened, and the architrave ſhould ſtand on a plinth, equal to two thirds thereof, or to the height of the ſtep, by which one aſcends into the houſe.

DORCHESTER, the capital of Dorſetſhire, ſituated on the river Froom, ſix miles north of Weymouth: weſt long. 2° 35′, and north lat. 50° 40′.

It gives the title of marquis to the noble family of Pierpoint, dukes of Kingſton, and ſends two members to parliament.

DORDONNE, a river of France, which runs through the province of Guienne, and falls into the Garonne, twelve miles below Bourdeaux.

DOREE, or JOHN DOREE, a fiſh called by authors faber. See the article FABER.

DORIC, in general, any thing belonging to the Dorians, an antient people of Greece, inhabiting near mount Parnaſſus.

DORIC ORDER, in architecture, the ſecond of the five orders, being that between the tuſcan and ionic. See the article ORDER, TUSCAN, and IONIC.

This order ſeems the moſt natural and beſt proportioned of all the orders, the ſeveral parts of it being founded on the natural poſition of ſolid bodies. Accordingly, the doric is the firſt, and moſt antient of the orders of architecture, and is that which gave the firſt idea or notion of regular building. See plate LXXVII. fig. 1.

It was indeed more ſimple at its firſt invention, than it is at preſent; and when they came in after times to adorn and enrich it more, the appellation of Doric was reſtrained to this richer manner, and then they called the primitive, ſimple manner, by the new name of Tuſcan.

Some time after its invention, it was reduced to the proportions, ſtrength and beauty of the body of a man: hence as the foot of a man was judged the ſixth part of his height, they made the doric column ſix diameters high. After that, they added another diameter to it, and made it ſeven, which augmentation ſeemed to bring it nearer to the proportion of a man, the human foot, at leaſt in our days, not being a ſixth but nearly a ſeventh part of the body.

The characters of the doric order, as they are now managed, are, the height of its column, which is eight diameters; the frieze which is adorned with triglyphs, drops, and metopes; its capital, which is without volutes, and its admitting of cymatiums.

It has been already obſerved, that the antients had two dorics; the firſt of which was the more ſimple and maſſive, and was chiefly uſed in temples; the ſecond which was the more light and delicate, they uſed in porticoes and theatres.

The doric is uſed by the moderns, on account of its ſolidity, in large, ſtrong buildings, as in the gates of cities and citadels, the outſides of churches, and other maſſy works, in which delicacy of ornaments would not be ſuitable.

The moſt conſiderable antient monuments of this order is the theatre of Marcellus at Rome, the capital, the height of the frieze, and projecture of which are much ſmaller than in the modern architecture.

Vignola adjuſts the proportion of the doric order as follows: he divides the whole height of the order without the pedeſtal into twenty parts, or modules, one of which he allows to the baſe; fourteen to the ſhaft, or ſuſt; one to the capital, and four to the entablature: the ſeveral parts and members may be ſeen under their reſpective heads. See the articles COLUMN, CORNICHE, BASE, FRIEZE, *&c.*

The DORIC *order delineated by equal parts, inſtead of modules and minutes.* The height of the pedeſtal being two diameters, and $\frac{1}{3}$, is divided into 4, giving one to the baſe, whoſe plinth is $\frac{2}{3}$ thereof; the other part is divided into ſeven, giving four to the torus, one to the fillet, and two to the hollow. The breadth of the dye is a diameter and one third. The projection of the baſe is equal to its height, and the fillet has 4 of theſe parts. The height of the corniche is half the baſe, being $\frac{1}{8}$ of the whole height, and is divided into nine, giving two to the hollow, one to the fillet, five to the corona, and one to the fillet: the projection of the hollow is three of theſe parts, of the corona ſix, and of the whole ſeven.

Baſe of the column. The height is half a diameter, and is divided into ſix, giving two to the plinth, 1 and $\frac{1}{2}$ to the lower torus, $\frac{1}{4}$ to the fillet, one to the ſcotia, $\frac{1}{4}$ to the fillet, and one to the upper torus. The fillet above the torus is equal to the others, and is part of the column. The projection is two of theſe parts, and one third thereof is for the upper fillet, and $\frac{2}{3}$ to the upper torus; and the fillet, under it, is perpendicular to the center. For forming the ſcotia, divide its height into 3, and on the line that ſeparates the one part above from the other two parts below, and perpendicular to the fillet, is the center for the firſt quarter ſweep; and the ſame diſtance forwards, in the line, is the center for the other quarter, and is alſo the projecture of the lower fillet.

The diminiſhing of this colum is $\frac{1}{6}$ of the diameter. The height of the capital is half a diameter, and is divided into 9, giving three to the frieze of the capital, one to the fillets, which are three, and are equal; two to the ovolo, two to the abacus, and one to the ogee and fillet which is $\frac{1}{3}$. For the projections, the fillets have one of theſe parts, the abacus three, and the whole four.

The height of the architrave is $\frac{1}{2}$ a diameter, and is divided into ſix parts, giving two to the firſt face, two to the ſecond, one to the bells and fillet, which is one third, and one to the band at top; the projection is equal to the band.

Fig. 1. DORIC-ORDER.

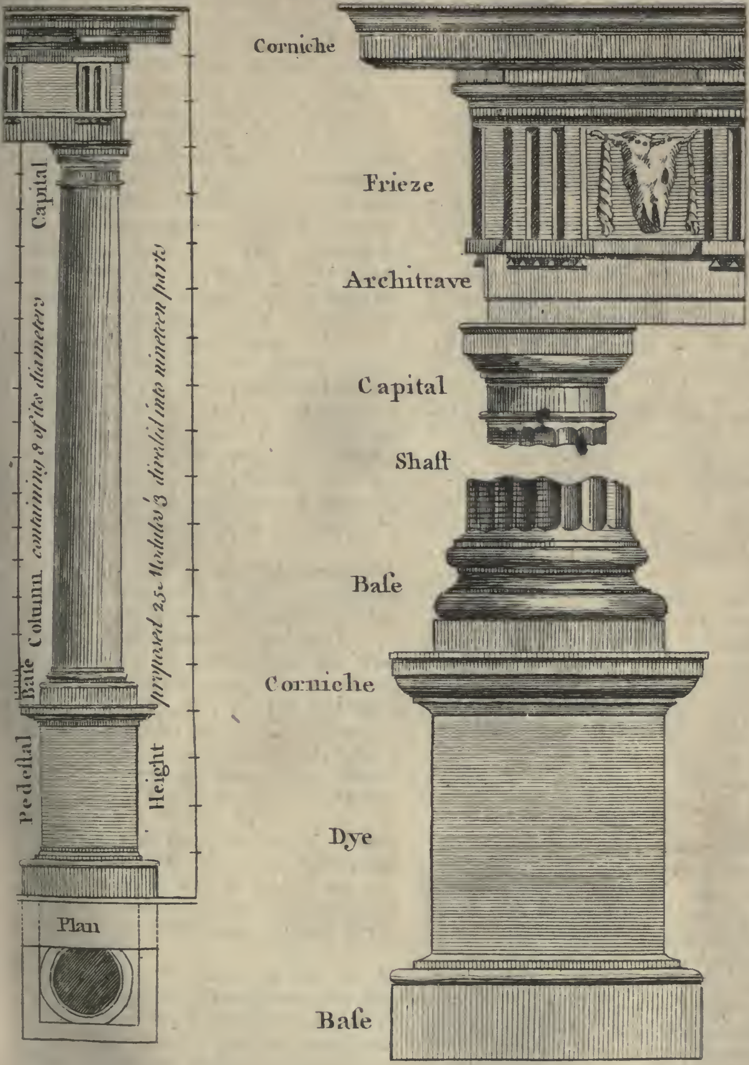

Order Entire.
Capital
Baſe
Column containing 8 of its diameters
Pedeſtal
Height propos'd 25 Modules 3 divided into nineteen parts
Plan
Corniche
Frieze
Architrave
Capital
Shaft
Baſe
Corniche
Dye
Baſe

Fig. 2. DOSSILS.

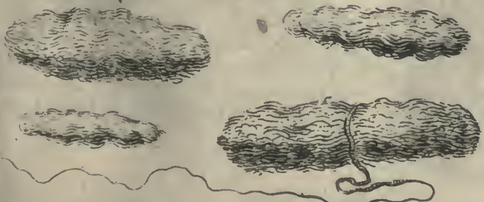
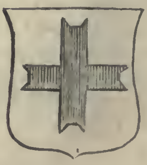


Fig. 3 DOUBLE FICHE.



J. Jeffreys Sculp

The frieze is in height $\frac{3}{4}$ of the diameter, and the triglyphs are in breadth $\frac{1}{2}$ a diameter, which are divided into 6, giving 1 to each of the channels, and 1 to the ſpaces between the channels.

The projection from the naked of the frieze is $\frac{3}{4}$ of a part; and the ſpaces, or metopes, between the triglyphs, ought to be equal to the height of the frieze.

The height of the corniche is $\frac{3}{4}$ of the diameter, and is divided into 9, giving 1 to the cap of the triglyph, 1 to the hollow and fillet, which is $\frac{1}{6}$, 1 to the ovolo, 1 to the mutule and fillet under it, which is equal to the other; $\frac{1}{2}$ part to the cap of the mutule and fillet, which is $\frac{1}{3}$, 1 and $\frac{3}{4}$ to the corona, $\frac{3}{4}$ to the cima reverſa, $\frac{1}{4}$ to the fillet, 1 and $\frac{1}{4}$ to the cima recta, and $\frac{1}{2}$ part to the fillet.

For the projections, the cap of the triglyph hath 1 of theſe parts, the hollow 1 and $\frac{3}{4}$, the ovolo 2 and $\frac{3}{4}$, the mutule 8 and $\frac{3}{4}$, the corona 9 and $\frac{3}{4}$, the cima reverſa 10 and $\frac{3}{4}$, and the whole 12 parts.

DORIC DIALECT, in grammar, one of the five dialects, or manners of ſpeaking which were principally in uſe among the Greeks.

It was firſt uſed by the Lacedemonians, particularly thoſe of Argos; afterwards it paſſed into Epirus, Lybia, Sicily, and the iſlands of Rhodes, Crete, *&c.*

According to the doric dialect, the vowels, η, ε, ο, ω, are changed into α; the diphthong ει into α or αι; and the conſonants β into γ; ζ into σδ; κ and ς into τ; τ and ρ into κ; λ with a τ or ϑ following it, into ν. Thus for φημη, τρεχω, κλειδας, βλεφαρα, *&c.* they ſay φαμα, τραχω, κλαδας, γλεφαρα, *&c.*

They likewiſe change ȣ into ω, as λωγω for λογȣ; alſo εος into ευς, as βασιλευς for βασιλεος: εα, αε, and αει into η, as κρη; for κρεας, εγελη; for εγελαε; and γελης for γελαεις: with other tranſmutations of the like nature.

DORIC MODE, in muſic, the firſt of the authentic modes of the antients; its character is to be ſevere, tempered with gravity and joy; and is proper upon religious occaſions, as alſo to be uſed in war. It begins *D, la, ſol, re.* Plato admires the muſic of the doric mode, and judges it proper to preſerve good manners, as being maſculine; and on this account allows it in his commonwealth. The antients had likewiſe their ſub-doric or hypodoric mode, which was one of the plagal modes. Its character was to be very grave and ſolemn: it began with *re*, a fourth lower than the doric.

DORING, or DARING, among ſportſmen, a term uſed to expreſs a method of taking larks by means of a clap net and a looking-glaſs. See the article CLAP-NET.

DORMANT, in heraldry, is uſed for the poſture of a lion, or any other beaſt, lying along in a ſleeping attitude, with the head on the fore-paws; by which it is diſtinguiſhed from the couchant, where, though the beaſt be lying, yet he holds up his head.

DORMANT-TREE, in architecture, is a name given by workmen to a great beam lying acroſs a houſe, commonly called a ſummer.

DORMER, in architecture, ſignifies a window made in the roof of an houſe, or above the entablature, being raiſed upon the rafters.

DORMITORY, a gallery in convents or religious houſes, divided into ſeveral cells, in which the religious ſleep or lodge.

DORMITORY is ſometimes uſed for a burying place.

DOR-MOUSE, a ſpecies of mus with a long hairy tail, and a white throat. See the article MUS.

This is a very pretty creature, of the bigneſs of the common mouſe; the head is ſmall, and not ſharp at the ſnout, as in many ſpecies: the ears are broad and ſhort; the eyes are large, bluiſh, bright, and very prominent; the head is of a reddiſh brown, very bright and ſhining; the back is of a duſkiſh brown, with a tinge of orange-colour; the belly is of the ſame colour, but ſtill paler; we have it in our fields and gardens, and call it the dor-mouſe, or ſleeper, from its naturally ſleeping all the winter-part of the year.

DORNOCH, a royal borough, and port town, of the county of Sutherland, in Scotland, ſituated on a frith of the ſame name, oppoſite to Taine, in weſt long. 3° 53, north lat. 58°.

DORONICUM, LEOPARD'S BANE, in botany, a genus of the ſyngeneſia-polygamia-ſuperflua claſs of plants, the compound flower of which is radiated: the proper flower is funnel-formed; there is no pericarpium, but the cup, being ſlightly connivent, contains a ſolitary ſeed, vertically ovated, compreſſed, ſulcated, and crowned with a downy pap.

The root of the doronicum officinarum is ſaid to be an alexipharmic, but it is not uſed in the preſent practice.

DORPT, or **DORPAT**, a city of Livonia, about fifty miles ſouth of Narva: eaſt long. 27° 25′, and north lat. 58°.

DORSAL, an appellation given to whatever belongs to the back. See the article DORSUM.

DORSAL MUSCLES are the muſcles of the back and loins, which are for the moſt part common: there are of the extenſors uſually reckoned three on each ſide, *viz.* the ſacro-lumbaris, the longiſſimus dorſi, and the ſemiſpinoſus: the flexors are three alſo, *viz.* the quadratus lumborum, the pſoas parvus, and the intertranſverſales lumborum. See each under its proper head.

DORSAL NERVES. See NERVE.

DORSIFEROUS PLANTS, among botaniſts, ſuch as are of the capillary kind, without ſtalks, and which bear their ſeeds on the backſide of their leaves.

DORSTENIA, in botany, a genus of the tetrandria-monogynia claſs of plants, which have no flower-petals, only a great many collections of the male and female parts on the diſc; each collection, or partial flower, being ſurrounded by its proper perianthium, as the whole are by a common involucrum or cup; the ſeeds, which are roundiſh and ſolitary, are contained in a common pulpy receptacle. See the article CONTRAYERVA.

DORSUM, BACK, in anatomy, comprehends all the poſterior part of the trunk of the body, from the neck to the buttocks.

The back is furniſhed with ſeveral muſcles, which are common to it with the loins, as the longiſſimus dorſi, the ſacro-lumbaris, and ſemiſpinoſus; theſe are called extenſors. See EXTENSOR.

To the back likewiſe belong the intertranſverſales lumborum, the quadratus lumborum, and the pſoas. See the article INTERTRANSVERSALIS, &c.

Its bones are the ſpina dorſi, ribs, and os ſacrum. See SPINE, RIBS, &c.

DORSUM is alſo uſed to denote the upper ſide of the hand and foot, in contradiſtinction to the lower ſide, called the palm and ſole. See HAND and FOOT.

DORSUM NASI, the ridge of the noſe. See the article NOSE.

DORT, a city of the United Provinces, ſituated in that of Holland, on an iſland in the river Maeſe, about ten miles eaſt of Rotterdam: eaſt long. 4° 40′, and north lat. 51° 47′.

DORTMOND, a city of Weſtphalia in Germany, about thirty miles north-eaſt of Duſſeldorp: eaſt longitude 6° 50′, and north latitude 51° 25′.

It is an imperial city, and conſtitutes a ſovereign ſtate.

DORYPHORI, in antiquity, an appellation given to the life-guard men of the roman emperors: they were held in ſuch great eſtimation, as frequently to have the command of armies conferred on them. It was likewiſe uſual for the chief commanders, to have their doryphori to attend them.

DOSE, in medicine and pharmacy, the quantity of a medicine given at one time; or the proportion which the ſeveral ingredients of a compound medicine bear to each other.

It is the buſineſs of the phyſician to adjuſt the doſes of medicines to the caſes of his patients; in doing which he cannot uſe too much caution, ſince the ſame doſe that would prove highly beneficial to one, may be fatal to another.

DOSITHEANS, *doſithei*, in church-hiſtory, a ſect among the Hebrews, being one of the branches of the Samaritans. See the article SAMARITANS.

They abſtained from eating any creature that had life, and were ſo ſuperſtitious in keeping the ſabbath, that they remained in the ſame place and poſture wherein that day ſurpriſed them, without ſtirring till the next day. They married but once, and a great number never married. Doſitheus, their founder, being diſſatisfied among the Jews, retired to the Samaritans, who were reputed heretics, and invented another ſect; and to make it more authentic, he went into a cave, where, by too long abſtinence, he killed himſelf. The name of doſitheans was alſo given to ſome of the diſciples of Simon Magus.

DOSSER, in military matters, a ſort of baſket, carried on the ſhoulders of men, uſed in carrying the overplus earth from one part of a fortification to another, where it is wanted.

DOSSIL, in ſurgery, lint made into a cylindric form, or reſembling the ſhape of dates, or olive-ſtones, the ſize of which is very different. Doſſils are uſed in dreſſing a diſordered part; and are ſometimes ſecured by a thread, tied round their middle. See plate LXXVII. fig. 2.

It requires a good deal of time and experience to acquire a proper expertneſs in making up theſe forms.

Theſe different forms of ſcraped lint are uſed;

uſed, 1. To ſtop the bleeding of freſh wounds; and in large wounds they ſhould firſt be dipped in ſome ſtyptic liquor, or ſprinkled with a ſtyptic powder. 2. To agglutinate and heal wounds, eſpecially if ſpread with ſome digeſtive ointment, or dipped in ſome vulnerary liquor. 3. In drying up wounds and ulcers. 4. In keeping the lips of wounds at a proper diſtance, that they may not unite before the bottom is well digeſted and healed. 5. To preſerve wounds from the injuries of the air.

The doſſils tied round with a thread, are chiefly uſed in dreſſing deep wounds and ulcers, that none of it may be left in them.

DOTE ASSIGNANDA, in law, a writ that formerly lay for a widow, on its being found by office, that the king's tenant was ſeized of lands in fee or tail at the time of his death, and that he held of the king in chief, *&c.* in which caſe the widow was to come into the court of chancery, and there make oath that ſhe would not marry without the king's leave; upon which ſhe had this writ to the eſcheator, to aſſign her dower.

DOTE *unde nihil habet*, a writ of dower which the widow may have againſt a perſon that bought land of her huſband in his life-time, whereof he was ſeized in fee ſimple or fee tail, and of which ſhe is dowable.

Recto de DOTE. See the article RECTO.

DOTTEREL, the engliſh name of a bird called by authors morinellus. See the article MORINELLUS.

DOUAY, a fortified city of the french Netherlands, ſituated on the river Scarpe, about fifteen miles ſouth of Liſle: eaſt long. 3°, and north lat. 50° 25′.

DOUBLE ASPECT, in painting. See the article ASPECT.

DOUBLE BASTION, in fortification. See the article BASTION.

DOUBLE CAST, in huſbandry, a term uſed by the farmers for that method of ſowing that does not diſpenſe the neceſſary quantity of ſeed for a piece of land at one bout, but requires going over every place twice.

DOUBLE DESCANT, in muſic. See the article DESCANT.

DOUBLE DIESIS. See DIESIS.

DOUBLE *horizontal dial*, one with a double gnomon, one of which points out the hour on the outward circle, and the other ſhews the hour upon the ſtereographic projection drawn upon it. This dial not only finds the meridian, hour, *&c.* but ſhews the ſun's place, riſing and ſetting, declination, amplitude, altitude, and azimuth, with many other uſeful propoſitions. See the article DIAL.

DOUBLE DANCETTE, in heraldry. See the article DANCETTE.

DOUBLE EXCENTRICITY. See the article EXCENTRICITY.

DOUBLE FEAST. See FEAST.

DOUBLE FICHY, or FICHE', in heraldry, the denomination of a croſs, when the extremity has two points, in contradiſtinction to fiché, where the extremity is ſharpened away to one point. See plate LXXVII. fig. 3.

DOUBLE FUGUE, in muſic. See FUGUE.

DOUBLE LETTER, in grammar, a letter which has the force and effect of two. The Greeks have three of theſe, *viz.* Ζ, Ξ, Ψ; the Latins have two X and *Z*; and moſt of the modern languages have the ſame.

DOUBLE MEASURE. See MEASURE.

DOUBLE PEDESTAL. See PEDESTAL.

DOUBLE PLEA, in law, is where the defendant in a ſuit alledges two ſeveral matters in bar of the plaintiff's action, when one of them is ſufficient. This is not admitted in common law. Thus when a perſon pleads ſeveral things, the one having no dependance upon the other, ſuch plea is accounted double, and will not be admitted; but where the things pleaded mutually depend on each other, and the party cannot have the laſt plea without the firſt, there the whole ſhall be received.

DOUBLE POINT, in the higher geometry. See CURVES *of the ſecond order.*

DOUBLE POSITION. See POSITION.

DOUBLE QUARREL, a complaint made by any clerk, or other, to the archbiſhop of a province, againſt an inferior ordinary, for delaying juſtice in ſome ſpiritual cauſe, as to give ſentence, inſtitute a clerk, or the like. It ſeems to be termed double quarrel, becauſe the complaint is uſually made both againſt the judge, and the party at whoſe ſuit juſtice is delayed.

DOUBLE RATIO,		DUPLE.
DOUBLE ROADS,		ROAD.
DOUBLE TENAILLE,	See	TENAILLE.
DOUBLE TIME,		TIME.
DOUBLE VAULT,		VAULT.

DOUBLE VESSEL, in chemiſtry, is when the neck of one bolt-head or matraſs is put and well luted into the neck of another, in order to refine and exalt ſpirits as high as can be. It is ſometimes called a pelican, and alſo a diota.

DOUBLETS, a game on dice within tables;

tables: the men, which are only fifteen, being placed thus; upon the ſice, cinque, and quater points, there ſtand three men a-piece; and upon the trey, duce, and ace, only two. He that throws higheſt hath the benefit of throwing firſt, and what he throws he lays down, and ſo doth the other: what the one throws, and hath not, the other lays down for him, but to his own account; and thus they do till all the men are down, and then they bear. He that is down firſt bears firſt, and will doubtleſs win the game, if the other throws not doublets to overtake him; which he is ſure to do, ſince he advances or bears as many as the doublets make, *viz.* eight for two fours.

DOUBLING, in the military art, is the putting two ranks or files of ſoldiers into one. Thus, when the word of command is, *double your ranks,* the ſecond, fourth, and ſixth ranks march into the firſt, third, and fifth, ſo that the ſix ranks are reduced to three, and the intervals between the ranks become double what they were before. *To double by half files,* is when the fourth, fifth, and ſixth ranks march up to double the firſt, ſecond, and third, or the contrary. *To double the files to the right,* is when every other file faces to the right, and marches into the next file to it, ſo that the ſix ranks are turned into twelve, and every file is twelve deep. *To double the files to the left,* is when every other file faces to the left, and marches into the next. In doubling the files, the diſtance betwixt the files becomes double.

Doubling, among hunters, who ſay that a hare doubles, when ſhe keeps in plain fields, and winds about to deceive the hounds.

Doubling, in the manege, a term uſed of a horſe, who is ſaid to double his reins, when he leaps ſeveral times together, to throw his rider: thus we ſay, the ramingue doubles his reins, and makes pontlevis.

Doubling *a cape or point,* in navigation, ſignifies the coming up with it, paſſing by it, and leaving it behind the ſhip.

Doubling, in heraldry, the linings of robes and mantles of ſtate, or of the mantlings in atchievements.

DOUBLON, or **Doubloon**, a ſpaniſh and portugueſe coin, being the double of a piſtole. See Coin and Pistole.

DOUBTINNG, *dubitatio,* the act of withholding our aſſent from any propoſition, on ſuſpicion that we are not thoroughly appriſed of the merits thereof; or from not being able peremptorily to decide between the reaſons for and againſt it.

Doubting is diſtinguiſhed by the ſchoolmen into two kinds, dubitatio ſterilis, and dubitatio efficax: the former is that where no determination enſues; in this manner the ſceptics and academics doubt, who with-hold their aſſent from every thing. See Scepticism, *&c.*

The latter is followed by judgment, which diſtinguiſhes truth from falſhood: ſuch is the doubting of the peripatetics and carteſians; the laſt in particular are perpetually inculcating the deceitfulneſs of our ſenſes, and tell us that we are to doubt of every one of their reports, till they have been examined and confirmed by reaſon. On the other hand, the epicureans teach that our ſenſes always tell truth, and that, if you go ever ſo little from them, you come within the province of doubting. See the articles Cartesians, Epicurean Philosophy, *&c.*

Doubting, in rhetoric, ſignifies the debate of the mind with itſelf, upon a preſſing difficulty. It is, for the moſt part, expreſſed by interrogation, though that is not neceſſary. Thus Cicero for Roſcius: "Quid primum querar? aut unde potiſſimum, judices, ordear? aut quod, aut a quibus, auxilium petam? deorum immortalium? populine romani?" *&c.* This figure keeps us in eager attention.

DOUCINE, in architecture, a moulding concave above and convex below, ſerving commonly as a cymatium to a delicate corniche. It is likewiſe called gula. See Cymatium and Gula.

DOUCKER, or Ducker. See Ducker.

DOVE, *columba,* in ornithology. See the article Columba.

Dove, in geography, the name of a river dividing Derbyſhire from Staffordſhire: alſo of a town of the Orleanois, in France, about twenty miles ſouth-eaſt of Angers.

Dove-tailing, in carpentry, is the manner of faſtening boards together by leting one piece into another, in the form of the tail of a dove. The dove-tail is the ſtrongeſt of the aſſemblages or jointings, becauſe the tenon, or piece of wood which is put into the other, goes widening to the extreme, ſo that it cannot be drawn out again, by reaſon the extreme or tip is bigger than the hole.

The French call it queue d'aronde; which name is alſo uſed by the Engliſh in fortification.

DOVELLA, in ichthyology, a ſpecies of labrus with two large teeth in the upper jaw. See the article LABRUS.

DOVER, a borough and port-town of Kent, ſituated on a rock, oppoſite to Calais in France, with a ſtrong caſtle: eaſt long. 25′, and north lat. 51° 10′.

Dover gives the title of duke to the dukes of Queenſbury, a branch of the noble family of Douglas; and ſends two members to parliament, ſtyled barons of the cinque-ports, whereof Dover is the chief. See the article CINQUE PORTS.

DOUGLAS, a port-town, and the beſt harbour in the Iſle of Man: weſt long. 4° 25′, and north lat. 54° 7′.

DOULEIA, in grecian antiquity, a kind of puniſhment among the Athenians, by which the criminal was reduced to the condition of a ſlave.

It never was inflicted but upon the *αλιμοι*, ſojourners, and freed ſervants.

DOWAGER, *dotiſſa*, a widow endowed, is a title applied to the widows of princes, dukes, earls, and perſons of high rank only.

DOWER, that portion which the law allows a widow out of the lands of her huſband, after his deceaſe. It is diſtinguiſhed into five kinds: 1. Dower by the common law, is a third part of ſuch lands and tenements as the huſband was ſolely ſeized in fee or tail, during the coverture, and this the widow is to enjoy during her life. 2. Dower by cuſtom, that part of the huſband's eſtate to which the widow is intitled, after the death of her huſband, by the cuſtom of ſome manor, ſo long as ſhe ſhall live ſingle and chaſte: this is, ſometimes more than one third part, for in ſome places ſhe has half the land, and in others the whole, during life. See the article *Free* BENCH. 3. Dower ad oſtium eccleſiæ, formerly made by the huſband immediately after the marriage, when the particular lands were expreſly named, of which his wife ſhould be endowed. 4. Dower ex aſſenſu patris, made of lands named by a ſon who was huſband with the conſent of his father; and this was always reduced into writing, as ſoon as the ſon was married. 5. Dower de la plus belle, which was where the wife was endowed with the faireſt part of the huſband's eſtate. Of theſe five the two firſt only of theſe writs of dower are now in uſe.

Admeaſurement of DOWER. See the article ADMEASUREMENT.

Aſſignment of DOWER, the ſetting out a woman's marriage-portion by the heir,

DOWLE-STONES, in our old writers, the ſame with land-marks.

DOWN, in geography, the capital of a county of the ſame name in the province of Ulſter, in Ireland: weſt longitude 5° 50′, and north latitude 54° 23′.

DOWNETON, or DUNKTON, a borough-town of Wiltſhire, five miles ſouth of Saliſbury.

It ſends two members to parliament.

DOWNHAM, a market-town of Norfolk, ten miles ſouth of Lynn, famous for its good butter; there being a thouſand, and ſometimes two thouſand firkins brought here every Monday, and ſent up the river Ouſe to Cambridge, from whence it is conveyed to London, in the Cambridge waggons.

DOWNS, a famous road near Deal, in Kent, where both the outward and homeward bound ſhips frequently make ſome ſtay; and ſquadrons of men of war rendezvous in time of war.

It affords excellent anchorage, and is defended by the caſtles of Deal, Dover, and Sandwich.

DOWRY, *dos*, is properly the money or fortune which the wife brings her huſband in marriage: it is otherwiſe called *maritagium*, marriage-goods, and differs from dower. See the article DOWER.

Among the Germans it was cuſtomary, in former times, for the huſband to bring a dowry to his wife.

DOWRY is alſo uſed, in a monaſtic ſenſe, for a ſum of money given along with a maid, upon entering her in ſome religious order.

In France, the dowry of perſons entering a monaſtery, to make profeſſion of a religious life, is limited by law. That given upon entering a monaſtery of carmelites, urſelines, and others not regularly founded, but eſtabliſhed ſince the year 1600, by letters patent, muſt not exceed the ſum of 8000 livers in towns where parliaments are held; not 6000, in other places.

DOXOLOGY, an hymn uſed in praiſe of the Almighty, diſtinguiſhed by the title of greater and leſſer.

The leſſer doxology was antiently only a ſingle ſentence, without reſponſe, running in theſe words, *glory be to the Father, and to the Son, and to the Holy Ghoſt, world without end, amen.* Part of the latter clauſe, *as it was in the beginning, is now, and ever ſhall be,* was inſerted ſome time after the firſt compoſition. Some read this antient hymn, *glory be to the*

the Father, and to the Son with the Holy Ghoſt. Others, *glory be to the Father in or by the Son, and by the Holy Ghoſt.* This difference of expreſſion occaſioned no diſputes in the church, till the riſe of the arian hereſy; but when the followers of Arius began to make uſe of the latter, as a diſtinguiſhing character of their party, it was intirely laid aſide by the catholics, and the uſe of it was enough to bring any one under ſuſpicion of heterodoxy. The doxology was uſed at the cloſe of every ſolemn office. The weſtern church repeated it at the end of every pſalm, and the eaſtern church at the end of the laſt pſalm. Many of their prayers were alſo concluded with it, particularly the ſolemn thankſgiving, or conſecration prayer at the euchariſt. It was alſo the ordinary concluſion of their ſermons.

The greater doxology, or angelical hymn, was likewiſe of great note in the antient church. It began with theſe words, which the angels ſung at our Saviour's birth, *glory be to God on high*, &c. It was chiefly uſed in the communion ſervice, and in men's private devotions. In the mozarabic liturgy, it is appointed to be ſung before the leſſons on chriſtmas day; and St. Chryſoſtom obſerves, that the aſcetics met together daily to ſing this hymn. Both the doxologies have a place in the church of England, the former being repeated after every pſalm, and the latter uſed in the communion ſervice.

DRABA, ARABIAN MUSTARD, or TURKY CRESSES, in botany, a genus of the tetradynamia-ſiliculoſa claſs of plants, the flower of which conſiſts of four oblong petals, and is cruciform: it has ſix ſtamina, four whereof are longer than the other two: the fruit a bilocular, elliptico-oblong, compreſſed pod, containing a number of ſmall roundiſh ſeeds, and wanting a ſtyle.

DRABLER, in the ſea-language, a ſmall ſail in a ſhip, being the ſame to a bonnet that a bonnet is to a courſe, and is only uſed when the courſe and bonnet are too ſhoal to cloth the maſt. See the articles COURSE and BONNET.

DRABS, in the ſalt-works, a kind of wooden boxes for holding the ſalt when taken out of the boiling pan, the bottoms of which are made ſhelving or inclining forwards, that the briny moiſture of the ſalt may drain off. See the article SALT.

DRACHM, a grecian coin of the value of ſeven pence three farthings. See COIN. This was alſo the name of a kind of weight, conſiſting of three ſcruples, and each ſcruple of two oboli. As to the proportion that the drachm of the Greeks bore with the ounce of the Romans, Q. Remnius, in his poem of weights and meaſures, makes the drachm the eighth part of an ounce, not much different from the crown of the Arabians, which weighs ſomething more than the drachm.

DRACHM, is alſo a weight, uſed at preſent by phyſicians, containing ſixty grains, or the eighth part of an ounce.

DRACO, the DRAGON, in zoology. See the article DRAGON.

DRACO MARINUS, the SEA-DRAGON, in ichthyology, the ſame with the araneus of Pliny: it is a ſpecies of trachinus, growing to ſix or eight inches in length, and called by ſome the weaver. See plate LXXIX. fig. 1.

DRACO VOLANS, in meteorology, a fiery exhalation, frequent in marſhy and cold countries.

It is moſt common in ſummer, and tho' principally ſeen playing near the banks of rivers, or in boggy places, yet ſometimes mounts up to a conſiderable height in the air, to the no ſmall terror of the amazed beholders; its appearance being that of an oblong, ſometimes roundiſh, fiery body, with a long tail. It is entirely harmleſs, frequently ſticking to the hands and cloaths of people without injuring them in the leaſt.

DRACO, in aſtronomy, a conſtellation of the northern hemiſphere, ſaid by different authors to contain 31, 32, 33, or even 49 ſtars.

DRACOCEPHALUM, DRAGON'S HEAD, in botany, a genus of the didynamia-gymnoſpermia claſs of plants, the corolla of which conſiſts of a ſingle ringent petal; the tube is of the length of the cup; the upper lip is fornicated and obtuſe, the lower is lightly divided into three ſegments; there is no pericarpium, but the cup cheriſhes the ſeeds, which are four ovato-oblong, and three ſided ones. See plate LXXIX. fig. 3.

DRACONARIUS, in antiquity, the perſon who carried the ſtandards called dragons, from the figures of theſe animals painted on them. Theſe were in uſe among the Perſians, Parthians, Scythians, Romans, &c.

DRACONTIC MONTH, the time of one revolution of the moon, from her aſcending node, called caput draconis, to her return thither.

DRACONTIUM, DRAGONS, in botany, a genus of the gynandria-polyandria claſs

Fig. 1. DRACO MARINUS, the *SEA-DRAGON.*

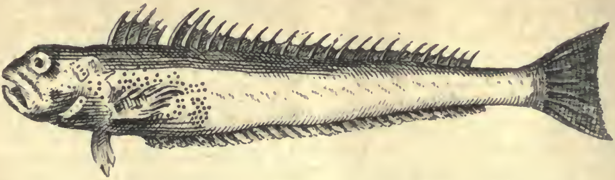


Fig. 2. DRACUNCULUS, the Little *SEA-DRAGON.*

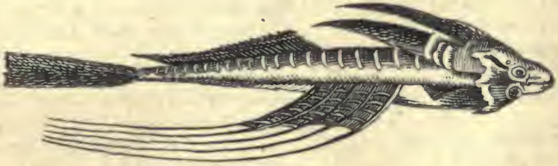


Fig. 3. DRACOCEPHALUM, *DRAGON'S HEAD.*

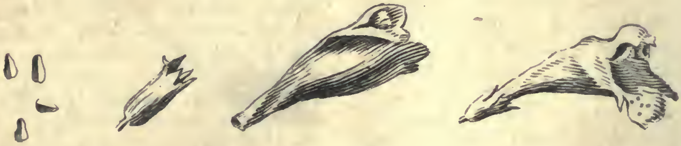
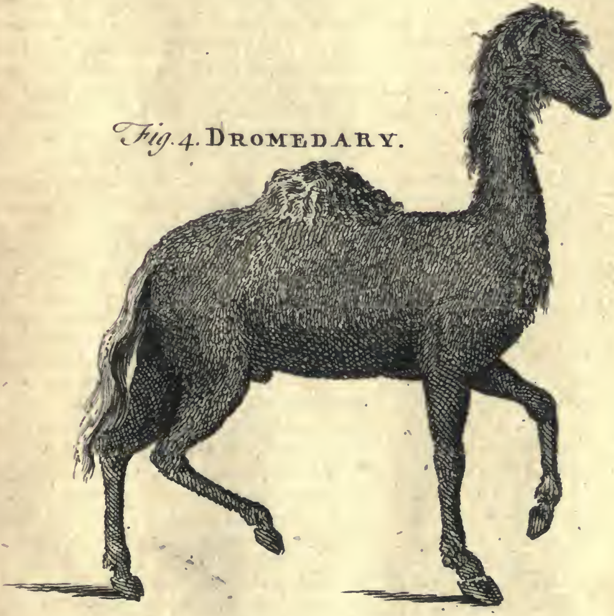


Fig. 4. DROMEDARY.



J. Jefferys sculp.

claſs of plants, the corolla of which conſiſts of five concave, ovated, obtuſe, and almoſt equal petals: the fruit is a ſingle roundiſh berry; and the ſeeds are numerous.

Its root is eſteemed a good alexipharmic and ſudorific, and accordingly preſcribed in the plague and malignant fevers, and for the bites of ſerpents.

DRACUNCULI, in medicine, ſmall long worms, which breed in the muſcular parts of the arms and legs, called Guinea-worms.

This diſtemper is very common in Guinea, and principally among the natives: Kempfer found it ſo alſo at Ormuz, upon the perſian gulph, and likewiſe in Tartary. Dr. Towne, in his treatiſe of the diſeaſes of the Weſt-Indies, informs us, that this diſtemper is not ſo frequent any where as on the Gold coaſt, at Anamboe, and Cormantyn.

The worm is white, round, and uniform, very much reſembling white, round tape, or bobbing. It is lodged between the interſtices and membranes of the muſcles, where it inſinuates itſelf ſometimes exceeding five ells in length. It occaſions no great pain at the beginning, but at ſuch times as it is ready to make its exit, the part adjoining to the extremity of the worm, where it attempts its excluſion, begins to ſwell, throb, and be inflamed: this generally happens about the ancle, leg, or thigh, and rarely higher.

The countries where this diſtemper prevails, are very hot and ſultry, liable to great droughts, and the inhabitants make uſe of ſtagnating and corrupted water, in which it is very probable that the ova of theſe animalcula may be contained; for the white people who drink this water, are obnoxious to the diſeaſe as well as the negroes.

The ſurgeons ſeldom attempt to extract this worm by making an inciſion; but as ſoon as they perceive the tumor riſe to a competent bulk, they endeavour to bring it to a ſuppuration, with all convenient expedition; and then the head of the worm diſcovers itſelf, which they ſecure, by tying it to a bit of ſtick, or cotton, that it may not draw itſelf up again: thus they continue to roll it round the ſtick, ſometimes one inch, ſometimes two or more, each day, taking great care not to break the worm, elſe it will be very difficult to recover the end of it again; and an abſceſs will be formed, not only at the ſuppurated part, but likewiſe through the whole winding of the muſcles, where the dead putrifying worm remains, which generally occaſions very obſtinate ulcers. During the extraction of the worm, the patient ſhould be plied with bitter aloetic and other anthelmintic medicines, in order to diſlodge the worm the ſooner from his tenement. When the worm is totally extracted, the remaining ulcer may be treated in the ſame manner as other common ulcers; nor does any farther inconvenience remain in the parts of which it had poſſeſſion. This diſeaſe, ſimply conſidered, very rarely, if ever, proves mortal.

DRACUNCULI is alſo uſed for a diſeaſe in children, ariſing from little worms called by that name. See the article WORMS.

DRACUNCULUS, the little SEA-DRAGON, in ichthyology, a ſpecies of cottus, with the ſecond back-fin white. See the article COTTUS.

The dracunculus is a very ſingular fiſh, growing to five or ſix inches in length. See plate LXXIX. fig. 2.

DRAGOMAN, DROGMAN, or DRUGGERMAN, a name given in the Levant to the interpreters kept by the ambaſſadors of chriſtian nations, reſiding at the Porte, to aſſiſt them in treating of their maſter's affairs.

DRAGON, *draco*, in zoology, an animal called alſo the flying lizard, being furniſhed with two lateral, membranaceous, and radiated wings: it is a true lizard, with a naked and four-legged body, and a long tail; though there are not wanting ſome who deny the exiſtence of any ſuch animal. See Plate LXXX. fig. 2.

Sea DRAGON. See DRACO MARINUS, and DRACUNCULUS, *ſupra*.

DRAGON'S BELLY, in aſtronomy. See the article VENTER DRACONIS.

DRAGON'S BLOOD, *ſanguis draconis*, in pharmacy, a moderately heavy reſin, of which there are two kinds: the one firm and compact, brought to us in lumps, of an inch long, or more, and about half an inch in diameter: theſe are wrapped up in certain long and narow leaves, and are called the drops, or tears, of dragon's blood. The other is brought to us in larger maſſes or cakes, of an irregular figure. This is leſs compact than the former, and leſs pure: it is called the common dragon's blood, and is greatly inferior to the former in value. Beſides theſe two common kinds, we ſometimes meet with a third, which is ſoft, and will take an impreſſion from the finger; but we are to avoid a counterfeit ſort of dragon'

dragon's blood that is ſometimes offered to ſale, and is made up of ſeveral different reſinous matters, coloured with the dragon's blood, or with braſil-wood: this is of no value. The dragon's blood in drops, is to be preferred to any other: the genuine dragon's blood is the fruit of a tall tree of the palm-kind, common in the iſland of Java, and ſome other parts of the Eaſt-Indies. It is a very powerful aſtringent, incraſſant, and drier. It is given in diarrhæas, dyſenteries, and hæmorrhages of all kinds; and, externally, in drying and healing ulcers. Its doſe is from five grains to twenty-five.

Dragon-fly, the engliſh name of the libella. See the article Libella.

Dragon's head and **tail**, the two nodes of the moon. See the article Node.

Dragon-shell, the engliſh name of a ſpecies of concamerated patella, with its roſtrum very much bent. See Patella.

Dragons, in botany. See the article Dracontium.

DRAGONNE'E, in heraldry. A lion dragonnée is where the upper half reſembles a lion, the other half going off like the hinder part of a dragon. The ſame may be ſaid of any other beaſt as well as a lion.

DRAGOON, in military affairs, a muſqueteer, mounted on horſeback, who ſometimes fights or marches on foot, as occaſion requires.

Dragoons are divided into brigades, as the cavalry, and each regiment into troops; each troop having a captain, lieutenant, cornet, quarter-maſter, two ſerjeants, three corporals, and two drums. Some regiments have hautboys: they are very uſeful on any expedition that requires diſpatch, for they can keep pace with the cavalry, and do the duty of infantry: they encamp generally on the wings of the army, or at the paſſes leading to the camp; and ſometimes they are brought to cover the general's quarters: they do duty on the generals of horſe and dragoons, and march in the front and rear of the army.

Dragoon, in ornithology, the name of a ſmall kind of carrier-pigeon, called columba tabellaria minima, by Moore. It is a baſtard breed between the two ſpecies of pigeons called the horſeman and the tumbler. They are very good breeders, and as they are lighter than the horſeman, they are ſuppoſed more expeditious in flight, for a few miles: but the horſeman outdoes them at greater lengths.

DRAGS, in the ſea-language, are whatever hangs over the ſhip in the ſea, as ſhirts, coats, or the like; and boats, when towed, or whatever elſe that, after this manner, may hinder the ſhip's way when ſhe ſails, are called drags.

DRAINING *of lands*, the freeing them from an over abundance of water, by means of drains. See the next article.

DRAINS, a name given, in the fen-countries, to certain large cuts or ditches, of twenty, thirty, nay, ſometimes forty feet wide, carried, thro' the marſhy ground, to ſome river, or other place, capable of diſcharging the water they carry out of the fen-lands.

The beſt way is to begin the drain at the loweſt place, and ſo to carry it into the bog towards the ſpring-head; where it will be proper to make croſs trenches, in order to drain it thoroughly. If the drains are deep, ſo that there is danger of cattle falling into them, they may be partly filled with ſtones, brick-bats, and the like; and covered with wood, flags, turf, &c. and the water will drain away through the ſtones. When the drains are left open, the earth ſhould not be laid in heaps by their ſides, as is too often done; but ſpread over the low places near them, or even carried off in carts. See the articles Ditch and Fen.

Moſt of theſe drains are made in our fen-countries by a body of men called the undertakers, whoſe reward is one third of the ground they drain: they erect ſluices alſo at a great expence, often not leſs than two thouſand pounds each; yet theſe, with all the care they employ in erecting them, are ſubject to be blown up by the vaſt weight of water that lies on them when the lands are overflown: ſome of theſe ſluices have too or more pair of doors, of ſix, eight, or ten feet high, which ſhut, when the water in the river is higher than in the drains, by the weight and force of it, and ſo, *e contra*, throw out a body of eight feet ſquare of water, for about ſix or ſeven hours, during the ebb. The real uſe of theſe drains is very evident from the viſible improvement of the lands where they have been cut. The inhabitants of Eſſex have a particular way of draining lands in ſuch grounds as lie below the high-water and ſomewhat above the low-water mark, and have land floods or fleets running through them, which make a kind of ſmall creek. When theſe grounds are firſt encloſed from the ſea, it is done with a bank raiſed from one ſide of the land deſigned to be taken in to the other, except a ſpace left where the creek or land-floods run into the ſea. When they begin to ſtop this, it is done at once, with a ſtrong firm head; only according to the quantity of water to be vented, they lay therein ſeveral ſquare troughs, compoſed of four large planks, of the ſame length that they deſign the thickneſs of the head to be; and towards the ſea is fitted a ſmall door, which opens when the freſh water bears out on it, and ſhuts when the ſalt water riſes, as already deſcribed. See SLUICE.

DRAKE, in ornithology, the male of the duck-kind. See ANAS and DUCK.

DRAM, or **DRACHM**, in commerce, a ſmall weight. See the article DRACHM and WEIGHT.

DRAMA, a poem containing ſome certain action, and repreſenting a true picture of human life, for the delight and improvement of mankind.

The principal ſpecies of the drama are two, comedy and tragedy. Some others there are of leſs note, as paſtoral, ſatire, tragi-comedy, opera, *&c.* See the articles TRAGEDY, COMEDY, *&c.*

The primary parts of the drama, as divided by the antients, are the protaſis, epitaſis, cataſtaſis, and cataſtrophe. The ſecondary parts are the acts and ſcenes. The acceſſary parts are the prologue, chorus, mimus, and epilogue, which pointed out the uſe of the piece, or conveyed ſome other notice to the audience in the poet's name. See the articles PROTASIS, PROLOGUE, CHORUS, *&c.*

The drama, ſays Voſſius, owes its riſe to the days of feſtivity; for in antient times, it was uſual for men, when they gathered in the fruits of the earth, to meet together that they might ſacrifice to the deity, and unbend their minds from the fatigues of the harveſt. Hence aroſe two ſorts of poetry, the one grave, in praiſe of the gods, the other jocoſe and full of lampoon, againſt one another. Thus, from the former aroſe tragedy, and from the latter, ſatire, comedy, and mimickry.

The drama, in ſome circumſtances, is ſuperior to epic poetry, particularly in action; for in the drama, the perſons themſelves are introduced, every thing is tranſacted in our ſight, and our eyes and ears at once are gratified. Beſides, the action in the drama, is much more compendious than in the epic; it takes up leſs time, and therefore requires more art to conduct it. It excites in the mind more rapid commotions, and conſequently makes the pleaſure and admiration more intenſe. For which reaſon, Ariſtotle gives the preference to the drama; not that he reckons it more noble in general than the epic, for that would be contrary to truth and reaſon, but only as far as its ſphere extends.

According to the Abbe du Bos, tragic poets ought to place their ſcenes in times remote from that in which they live; but comedy, on the contrary, ought to be fixed in the very places and times in which it is repreſented; its deſign being to make us laugh at the expence of ridiculous perſons, in order to purge us of thoſe faults it expoſes. Now we cannot diſtinguiſh nature ſo eaſily, when ſhe appears in ſtrange cuſtoms, manners, and apparel, as when ſhe is clad, as it were, after our own faſhion; whereas we always diſtinguiſh human nature in the heroes of tragedies, whether their ſcenes be at Rome or Sparta, by reaſon only great virtues or great vices are there repreſented.

The dramatic poetry of the Romans, was at firſt divided into three ſorts, tragedy, ſatire, and comedy; which were afterwards ſubdivided into ſeveral ſpecies. They had two ſpecies of tragedies, *viz.* the tragœdiæ palliatæ, in which the perſonages, manners, and dreſs were entirely greek; and the tragœdiæ prætextatæ, or prætextæ, wherein the perſonages and manners were roman. The ſatire was a kind of paſtoral poetry, which ſome authors aſſert to have held a kind of middle rank between tragedy and comedy; which is almoſt all we know of it. Comedy, in like manner as tragedy, was divided firſt into two ſpecies, *viz.* the greek, or palliata; and the roman or togata, by reaſon of the introducing plain citizens into the latter, whoſe dreſs was called toga. The roman comedy was again ſubdivided into four ſpecies; the togata, properly ſo called, the tabernaria, the attellana, and the mimus. Pieces of the firſt ſort were very ſerious, and admitted even of perſons of diſtinction, for which reaſon they were ſometimes called pretextatæ. The ſecond were comedies of a leſs ſerious nature; and took their name from taberna; which ſtrictly ſignified a place of rendezvous, proper for aſſembling perſons of different conditions, whoſe characters were played off in thoſe pieces. The attellana was a kind of piece very like the italian comedies; that is, thoſe whoſe dialogues are not written. The actor, therefore, of the attellanæ, performed his part juſt as he pleaſed. The mimus reſembled our farces, and the actors thereof performed always bare-foot: whereas, in tragedy, they wore a ſort of ſhoe, or boot, called cothurnus; and, in the other ſpecies of comedy, another kind called ſoccus.

For the laws of the drama, ſee the articles UNITY, ACTION, CHARACTER, FABLE, &c.

DRAMATIC, in poetry, an epithet given to pieces written for the ſtage. See the article DRAMA.

Stylo-DRAMATICO, in the italian muſic. See the article STYLE.

DRANK, among farmers, a term uſed to denote wild oats, which never fail to infeſt worn-out lands; ſo that when plowed lands run to theſe weeds and thiſtles, the farmer knows it is high time to fallow them, or elſe to ſow them with hay-ſeed, and make paſture of them.

Some, indeed, deſtroy the drank, by ſowing the lands with beans, and letting looſe ſheep upon them when young. This muſt be done in dry weather, and the ſheep eat up the drank and other weeds, without touching the beans.

DRAPERY, in ſculpture and painting, ſignifies the repreſentation of the clothing of human figures, and alſo hangings, tapeſtry, curtains, and moſt other things that are not carnations or landſcapes.

The art of drapery conſiſts, 1. In the order of the folds or plaits, which ought to be ſo managed, that you may eaſily perceive what it is they cover, and diſtinguiſh it from any thing elſe. Again, the folds ought to be large, as breaking and dividing the ſight the leſs; and there ſhould be a contraſt between them, otherwiſe the drapery will be ſtiff. 2. In the quality of the ſtuffs; for ſome make their folds abrupt and harſh, others more ſoft and eaſy: the ſurface of ſome have a luſtre, others are flat and dead; ſome are fine and tranſparent, others firm and ſolid. 3. In the variety of colours, which, when well managed, makes the greateſt beauty of painting; all not being equally amicable and friendly with reſpect to each other, and ſome never to be placed near certain others.

M. De Piles obſerves, that drapery muſt never be made to adhere to the parts of the body; that a great motion and lightneſs of the drapery are only proper in figures in great agitation, or expoſed to the wind; and that the nudities of the figures ſhould always be deſigned, before the painter proceeds to the draperies.

Obſerve the following directions. Draw the out-lines of garments lightly, beginning with the great folds, which you may afterwards ſtroke into leſſer; but be ſure they croſs not one another. Make the drapery bend with the body, according as it ſtands in or out, ſtraight or crooked, or turns one way or another; obſerving that the cloſer the garment ſits on the body, the narrower and ſmaller muſt the folds be. All the folds muſt conſiſt of two lines, and no more, which you may turn with the garment at pleaſure, ſhadowing the inner deep, and the outermoſt more light; and if the folds be never ſo curiouſly contrived, ſpare not to ſhadow them, if they fall inward from the light, with a double or triple ſhadow, as the occaſion requires. The out-lines muſt be continued through the whole garment; the leſſer you may break off and ſhorten as you pleaſe. The ſhades in ſilk and fine linen, require little folds, and a light and rare ſhadow; and ſo alſo fine drapery requires more and ſharper folds than coarſe. Obſerve the motion of the wind and air for drawing looſe apparel all one way; and examine the nature and diſpoſition of light, eſpecially as it has relation to the ſun or any bright body. Moreover, the plaits and folds muſt have their motions according as they are managed by the wearer, as under the arm, and under the knee, by opening and ſtretching out the arm and leg, making always hard, ſtiff, and groſs folds, that by their appearance the nature and quality of the garment may be known, &c. But mean motions, ſuch as appear in the folds of ſtuff and other cloths of fine wool, may become pliable to a perſon's limbs, and ſo made not only into ſweet and pleaſant folds, but may follow the bare fleſh very well, falling pliably about the loins or any other part. In other kinds of mixt motions, called turnings or croſſings, which are proper unto damaſks, cloths of gold, &c. the folds croſſing and breaking one another, appear from the various qualities of the drapery, and muſt be ſo performed, as not to ſavour of an over-affected imitation, without grace or order.

DRASTIC, in phyſic, an epithet beſtowed on ſuch medicines as are of preſent efficacy, and potent in operations; and is commonly applied to emetics and cathartics.

DRAVE, a large navigable river, which, taking its riſe in the archbiſhopric of

Saltzburg, in Germany, runs ſouth-eaſt through Stiria; and continuing its courſe, divides Hungary from Sclavonia, and falls into the Danube at Eſſeck.

DRAUGHT, or DRAFT, in architecture, the figure of an intended building, deſcribed on paper, in which is laid down, by ſcale and compaſſes, the ſeveral diviſions and partitions of the apartments, rooms, doors, paſſages, *&c.* in their due proportion to the whole building.

It is cuſtomary, and alſo exceedingly convenient, for any perſon, before he begins to erect a building, to have deſigns or draughts drawn upon paper or vellum, wherein the ichnography or ground-plot of every floor or ſtory is delineated; as alſo the form or faſhion of each front, with the windows, doors, ornaments, in an orthography, or upright. Sometimes the ſeveral fronts, *&c.* are taken and repreſented in the ſame draught, to ſhew the effect of the whole building, which is called ſcenography, or perſpective. See the article SCENOGRAPHY.

DRAUGHT-COMPASSES, are ſuch as have moveable points, to draw fine draughts in architecture. See COMPASSES.

DRAUGHT, in medicine. See POTION.

DRAUGHT, in painting. See the articles DESIGN and DRAWING.

DRAUGHT, in trade, called alſo CLOFF or CLOUGH, is a ſmall allowance on weighable goods, made by the king to the importer, or by the ſeller to the buyer, that the weight may hold out when the goods are weighed again.

The king allows 1 ℔ draught for goods weighing no leſs than 1 Cwt. 2 ℔ for goods weighing between 1 and 2 Cwt. 3 ℔ for goods weighing between 2 and 3 Cwt. 4 ℔ from 3 to 10 Cwt. 7 ℔ from 10 to 18 Cwt. 9 ℔ from 18 to 30, or upwards.

DRAUGHT-HOOKS, are large hooks of iron, fixed on the cheeks of a cannon-carriage, two on each ſide, one near the trunnion hole, and the other at the train, diſtinguiſhed by the name of fore and hind draught-hooks. Large guns have draught-hooks near the middle tranſum, to which are fixed the chains that ſerve to keep the ſhafts of the limbers on a march. The fore and hind hooks are uſed for drawing a gun backwards or forwards, by men with ſtrong ropes, called draught-ropes, fixed to theſe hooks.

DRAUGHT-HORSE, in farming, a ſort of coarſe made horſe, deſtined for the ſervice of the cart or plough. In the choice of theſe horſes, for what is called the ſlow draught, they are to be choſen of an ordinary height; for otherwiſe, when put into the cart, one draws unequally with the other, and the tall ones hang upon the low ones. The draught horſe ſhould be large bodied, and ſtrong loined, and of ſuch a diſpoſition as rather to be too dull than too briſk; and rather to crave the whip, than to draw more than is needful. Mares are the fitteſt for this uſe for the farmer, as they will be kept cheap, and not only do the work, but be kept breeding, and give yearly increaſe of a foal of the ſame kind, and fit to be bred to the ſame purpoſes. They ſhould have a good head, neck, breaſt, and ſhoulders: for the reſt of the ſhape, it is not of much conſequence, only for breeding; the mare ſhould have a large belly; for the more room a foal has in the dam, the more fit he will be for that employ. See the article FOAL.

DRAW, in the ſea-language. A ſhip is ſaid to draw ſo much water, according to the number of feet ſhe ſinks into it; ſo that if a ſhip ſink into the water eighteen feet perpendicularly, ſhe is ſaid to draw eighteen feet water; and according as ſhe draws more or leſs, ſhe is ſaid to be of more or leſs draught.

DRAW-BACK, in commerce, certain duties, either of the cuſtoms or of the exciſe, allowed upon the exportation of ſome of our own manufactures; or upon certain foreign merchandize, that have paid duty on importation.

The oaths of the merchants importing and exporting, are required to obtain the draw-back of foreign goods, affirming the truth of the officer's certificate of the entry, and the due payment of the duties: and theſe may be made by the agent or huſband of any corporation or company, or by the known ſervant of any merchant uſually employed in making his entries, and paying his cuſtoms. In regard to foreign goods entered outwards, if leſs quantity or value be fraudulently ſhipped out than is expreſſed in the exporter's certificate, the goods therein mentioned, or their value, are forfeited, and no draw-back to be allowed for the ſame. Foreign goods exported by certificate, in order to obtain the draw-back, not ſhipped or exported, or re-landed in Great Britain, unleſs in caſe of diſtreſs, to ſave them from periſhing, are to loſe the benefit of the draw-back, and are forfeited, or their value, with the veſſels, horſes, carriages, &c. employed in the re-landing thereof; and the perſons employed in the re-landing them, or by whoſe privity they are re-landed, or into whoſe hands they ſhall knowingly come, are to forfeit double the amount of the draw-back. Officers of the cuſtoms conniving at, or aſſiſting in any fraud relating to certificate-goods, beſides other penalties, are to forfeit their office, and to ſuffer ſix months impriſonment, without bail or mainprize; as are alſo maſters, or perſons belonging to the ſhips employed therein. Bonds given for the exportation of certificate goods to Ireland, muſt not be delivered up, nor draw-back allowed for any goods, till a certificate under the hands and ſeals of the collector or comptroller, &c. of the cuſtoms be produced, teſtifying the landing.

The computation of what is to be drawn back upon the exportation of foreign goods, may be ſeen under their reſpective heads.

Draw-bridge, a bridge made after the manner of a floor, to draw up, or let down, as occaſion ſerves, before the gate of a town or caſtle. See Bridge.

A draw-bridge may be made after ſeveral different ways, but the moſt common are made with plyers, twice the length of the gate, and a foot in diameter. The inner ſquare is traverſed with a croſs, which ſerves for a counterpoiſe; and the chains which hang from the extremities of the plyers to lift up or let down the bridge, are of iron or braſs.

In navigable rivers it is ſometimes neceſſary to make the middle arch of bridges with two moveable platforms, to be raiſed occaſionally, in order to let the maſts and rigging of veſſels paſs through. This kind of draw-bridge is repreſented in plate LXXVIII. where A B is the width of the middle arch; A L and B L, the two piers that ſupport the draw-bridge N O, one of the platforms of which is raiſed and the other let down, having the beam P Q for its plyer. To N O are ſuſpended two moveable braces E H, E H, which reſting on the ſupport E, preſs againſt the bracket M, and thereby ſtrengthen the draw-bridge. Theſe braces are conducted to the reſt by means of the weight S, pulling the chain S L E.

Draw-gear, denotes any kind of harneſs for draught horſes.

DRAWER *of a bill of exchange*, the perſon who draws the bill upon his correſpondent. See Bill and Exchange.

DRAWING, in general, denotes the action of pulling out, or hauling along: thus we read of tooth-drawing, wire-drawing, &c. See Tooth-drawing, &c.

Drawing, the art of repreſenting the appearances of objects by imitation, or copying without the aſſiſtance of mathematical rules.

The general precepts for drawing, are as follow. 1. Begin with plain, geometrical figures, as lines, angles, triangles, polygons, arches, circles, ovals, cones, cylinders, and the like, being the foundation of all other proportions. The circle is of uſe in the ſeveral orbicular forms, as the ſun, moon, globes, &c. the oval in giving a juſt proportion to the face and mouth, and the ſquare confines a picture you are to copy, &c. the triangle is of uſe in drawing a ſide or half face; angles and arches in perſpective, and the polygon in ground plots, fortifications, &c. the cone, in ſpires, ſteeples, tops of towers, &c. the cylinder, in columns, pillars, pilaſters, &c. See the article Perspective.

2. Having brought your hand to be fit and ready in general proportions, accuſtom yourſelf to give every object its due ſhade, according to its concavity or convexity, and to elevate or depreſs the ſame, as the object appears either nearer or farther off the light. See the articles Proportion, Design, and Shade.

3. The ſecond practice of drawing, conſiſts in forming fruits, as apples, pears, cherries, &c. with their leaves; the imitation of flowers, as roſes, tulips, carnations, &c. herbs, trees, &c. of different kinds.

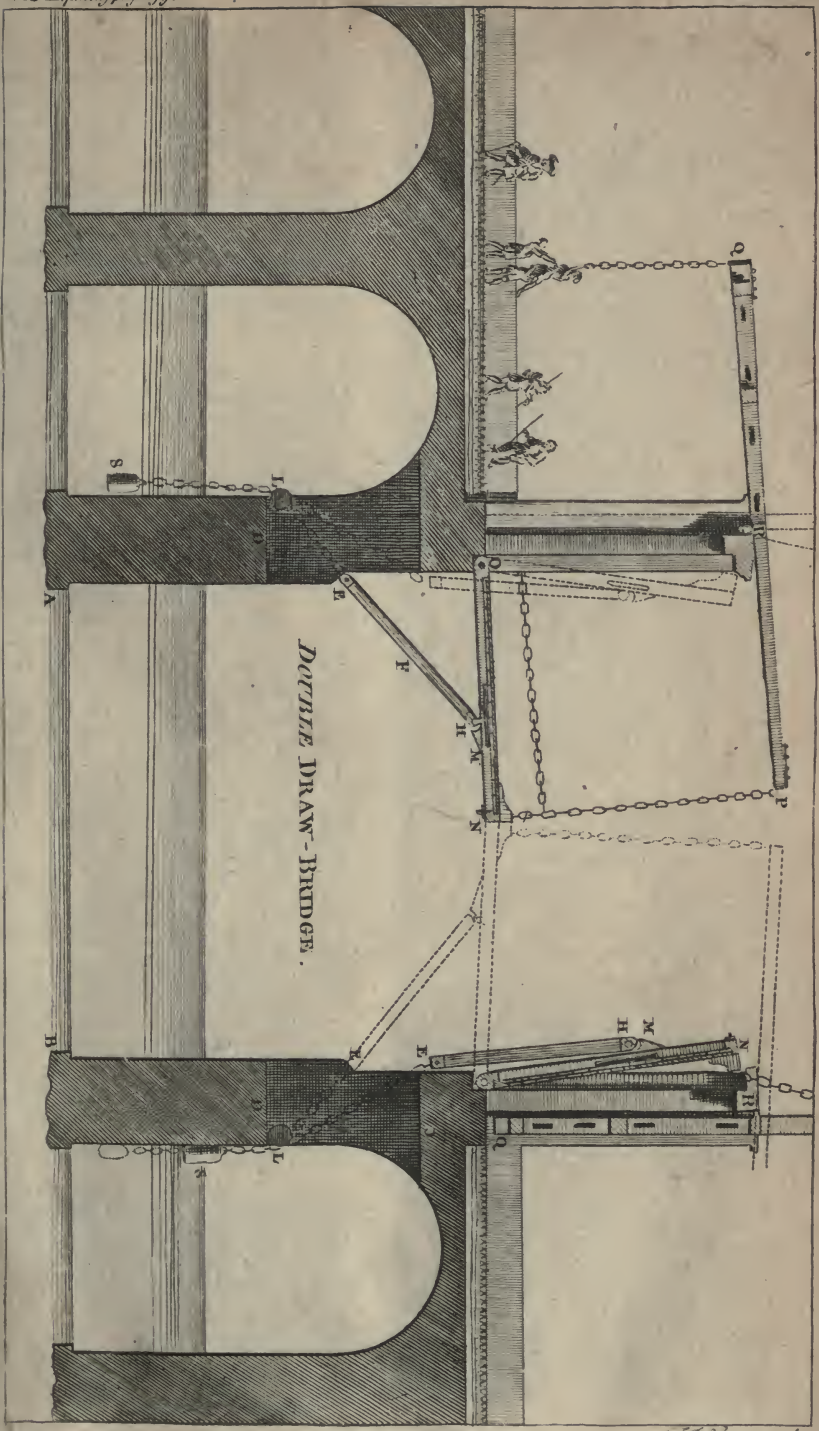
4. The third, in the imitation of beaſts, fowls, fiſhes, &c.

5. The fourth practice of drawing conſiſts in the imitation of the body of man, with all its lineaments, as head, noſe, eyes, ears, cheeks, arms, and ſhadows, all exactly proportioned, both to the whole, and to one another.

6. The fifth is in the drapery, in the imitation of cloathing, and artificially ſetting off the outward coverings, habit, and ornaments of the body, either of cloth, ſtuff, ſilk, or linen, in their natural and proper folds. See Drapery.

7. In drawing of all the forms beforementioned, it is requiſite to be firſt perfect in the laying down the exact proportion; ſecondly, in the general or outward lines, before you proceed to ſhadowing, or trimming the work within.

8. In mixed and uncertain forms, where the



DOUBLE DRAW-BRIDGE.

T. Jefferys sculp.

the circle, ſquare, &c. will be of no uſe, but only in the idea thereof in your own fancy, as horſes, oxen, and the like, you muſt do it by judgment, and ſo gain the true proportions by aſſiduous practice: thus, having the ſhape of the thing in your mind, firſt draw it rudely with a coal; then, with more exactneſs, with a lead or pencil; then peruſe it well, and mend it in thoſe parts you have erred in, according to the idea you carry in your mind. When it is mended by your own judgment, compare it with ſome good pattern of the ſame kind, and amend it by that.

9. Having good copies to draw after, learn to reduce them to other proportions, either larger or ſmaller; and this by frequent practice.

10. Let a perfection in drawing be attained by diligent exerciſe, and the inſtruction of a good maſter, before there be any attempts as to colouring and painting; for the former being attained, the reſt will be eaſily underſtood, and gained by frequent practice.

Particular obſervations with regard to DRAWING, *are as follow.* 1. If you draw after a print or picture, place it in ſuch a light, that the gloſs of the colours may not interrupt your light, and that the light and your eye may equally and obliquely fall upon the piece, which ſhould be placed at ſuch a diſtance, that, upon opening your eye, you may view it at once: the larger the picture is, the greater diſtance off it ſhould be placed: it ſhould alſo be right before you, and a little reclining.

2. Draw your out-lines at firſt very faint, and with a coal; and let them be drawn agreeable to the pattern, before you begin to ſhadow any part of it. When you have drawn one feature, it ſhould, in ſome meaſure, be a direction for you to draw the other, by obſerving the diſtance from that to the next feature; making a ſmall mark at the place with your coal, then draw it, and ſo to the next, till you have drawn the whole figure.

3. Then obſerve the middle of the picture you would copy, and touch upon the paper with the point of your coal: afterwards, obſerve the more conſpicuous and uppermoſt figures, if there are more than one, which you are to touch lightly in their proper places: thus running over the whole draught, you will ſee, as it were, the ſkeleton of the piece to draw.

4. Having made out theſe ſketches, view them diligently, if they anſwer your pattern or not; for the geſtures of the life ought to ſhew themſelves eminently in the firſt and rudeſt draughts thereof: correct and mend whatever you perceive amiſs, adding and diminiſhing as it varies from the pattern; by which method it will be brought nearer and nearer to the life.

5. Obſerve the diſtance of one limb, joint, or muſcle, from another, and the ſame in all other accidents of the figure, their length, breadth, turnings, &c. ſhadow next to the light very faintly; and where you ſee bold and free touches, be not timorous in expreſſing the ſame. In drawing a head by the life, or otherwiſe, take care to place the features exactly right upon the croſs lines, whether it be a full face, or three quarter face. In foreſhortening you muſt make the croſs lines to fly upwards, where they look upwards; but where the aſpect is downwards, they muſt be made downwards, in a circular manner. Having drawn the out-lines true, with a coal, you are to proceed to trace the ſame lines again with a pen, indian ink, &c. drawing them with more exactneſs, and by imitating all the hatches with their exact diſtances one from another, their croſſings, turnings and windings, with more boldneſs and freedom perfect your deſign.

6. In drawing after a naked body, all the muſcles are not to be ſo plainly expreſſed as in anatomical figures; but that ſide whoſe parts are moſt apparent, and of ſignification in the performance of any action, muſt be made to appear more or leſs, according to the force of that action.

7. In drawing young perſons, the muſcles muſt not appear manifeſtly ſo hard, as in elder and full grown perſons: the ſame is to be obſerved as to fat and fleſhy perſons, and ſuch as are very delicate and beautiful; and in women, ſcarce any muſcles at all are to be expreſſed, or but very little, unleſs it be in ſome very terrible action, and then too they are to be repreſented very faintly; the like is alſo to be obſerved as to little children.

8. The motion of the whole body muſt be conſidered in drawing of the muſcles; as in the riſing and falling of the arms, the muſcles of the breaſt do appear more or leſs; the hips do the like according as they are bent outward or inward; and it is the ſame chiefly in the ſhoulders, ſides,

and neck, according to the ſeveral actions of the body.

9. The proportion of the figure ought to be multiplied by degrees, in proportion of one to two, three, four, *&c.* for herein the chief ſkill conſiſts: the diameter of the biggeſt place, between the knee and the foot, is double to the leaſt, and the largeſt part of the thigh, triple.

DRAWING MEDICINES, thoſe more uſually called epiſpaſtics and ripeners. See the articles EPSIPASTIC and RIPENERS.

DRAWING *of a bill of exchange*. See the articles DRAWER and BILL.

DRAWING, among ſportſmen, the beating the buſhes after a fox.

Drawing amiſs, is ſaid of the hounds or beagles, when they hit the ſcent of their chace contrary, ſo as to purſue it up the wind, when they ſhould have done it down.

Drawing on the ſlot, is when the hounds touch the ſcent, and draw on till they hit on the ſame ſcent.

DRAWING *a caſt*, among bowlers, is winning the end, without ſtirring the bowl or block.

Fine-DRAWING, among taylors, the art of ſowing up button-holes, or any rents in cloth, in ſo nice a manner, as that they cannot be diſcovered from the entire part of the cloth.

DRAY, a kind of cart uſed by brewers, for carrying barrels of beer or ale; alſo a ſledge drawn without wheels.

DRAY, among ſportſmen, denotes ſquirrel-neſts, built in the tops of trees.

DRAYTON, a market-town of Shropſhire, fourteen miles north-eaſt of Shrewſbury.

DREAMS. According to Wolfius every dream takes its riſe from ſome ſenſation, and is continued by the ſucceſſion of phantaſms in the mind. His reaſons are, that when we dream we imagine ſomething, or the mind produces phantaſms; but no phantaſm can ariſe in the mind, without a previous ſenſation: hence neither can a dream ariſe without ſome previous ſenſation. He obſerves farther, that though it be certain *a priori*, from the nature of the imagination, that dreams muſt begin by ſome ſenſation, yet that it is not eaſy to confirm this by experience; it being often difficult to diſtinguiſh thoſe ſlight ſenſations, which give riſe to dreams from phantaſms or objects of imagination. Yet this is not impoſſible in ſome caſes, as when the weak ſenſation ſufficient to give riſe to a dream gradually becomes ſtronger, ſo as to put an end to it, as it often happens in uneaſy and painful ſenſations.

The ſeries of phantaſms, or objects of imagination which conſtitute a dream, ſeem to be ſufficiently accounted for, from the law of imagination, or of aſſociation; though it may be extremely difficult to aſſign the cauſe of every minute difference, not only in different ſubjects, but in the ſame, at different times, and in different circumſtances. We have an eſſay on this ſubject by M. Formey, in the *Mem. de l'Acad. de Berlin, tom.* 2. *p.* 316. He expreſsly adopts Wolfius's propoſition above-mentioned, that every dream begins by a ſenſation, and is continued by a ſeries of acts of imagination, or of phantaſms: and that the cauſe of this ſeries is to be found in the law of the imagination.

Hence he concludes thoſe dreams to be ſupernatural, which either do not begin by ſenſation, or are not continued by the law of the imagination.

A learned author has lately aſſerted, that our dreams are prompted by ſeparate immaterial beings. He contends, that the phantaſm, or what is properly called the viſion, is not the work of the ſoul itſelf, and that it cannot be the effect of mechanical cauſes; and therefore ſeems to conclude, they muſt be the work of ſeparate ſpirits acting on our minds, and giving us ideas while we ſleep. We muſt refer to the author of this extraordinary hypotheſis, for a farther account of it. See *Eſſay on the phænomenon of dreaming*, in the 2d vol. of the *Enquiry into the nature of the human ſoul*, 3d edit. Lond. 1745.

Lord Bacon laments that Ariſtotle dropt the conſideration of what he calls the ſecond art of prediction and impreſſion, or the interpretation of natural dreams, which, from the agitation of the mind, diſcovers the ſtate and diſpoſitions of the body, as he honoured phyſiognomy, or the firſt of theſe arts, with an enquiry: though this has indeed been done by Hippocrates; and he obſerves that tho' later ages have debaſed theſe arts with ſuperſtitious and fantaſtical mixtures, yet that when purged and truly reſtored, they have a ſolid foundation in nature, and uſe in life. See PHYSIOGNOMONICS.

Bacon further obſerves, that the interpretation of natural dreams has been much laboured, but mixed with numerous extravagancies, and adds that, at preſent it ſtands not upon its beſt foundation, which is, that where the ſame thing happens from an internal cauſe, as alſo uſually happens from an external one, there the external action paſſes into a dream. Thus the ſtomach may be oppreſſed by a groſs internal vapour, as well as by an external weight, whence thoſe that have the night-mare dream that a weight is laid upon them, with a great concurrence of circumſtances: ſo again the viſcera being equally toſſed by the agitation of the waves at ſea, as by a collection of wind in the hypochondria; hence melancholy perſons frequently dream of ſailing and toſſing upon the waters; and inſtances of this kind are numerous.

The phyſicians who have accurately examined the ſtate of their patients in every particular circumſtance, have not omitted at times, to enquire into their dreams in thoſe hours of ſleep which their ill ſtate allows them; and partly from experience, partly from reaſon and analogy, have found that there are many preſages of diſeaſes to come, and many indications of ſuch as are preſent, but unperceived, at leaſt not ſeen in their full extent, to be had from what the ſenſes ſuffer in dreams. Indeed if dreams are different from what might be expected from the buſineſs of the day, or the turn of thought before, they may always be looked upon as ſigns of a more or leſs diſtempered ſtate of body, and the true condition of that ſtate may often be better learned from them, than from any other means. What has been obſerved by phyſicians in regard to the prognoſtics from dreams, may be ſummed up in the following manner; to dream of fire indicates a redundance of yellow bile: to dream of fogs or ſmoak indicates a predominancy of black bile; to dream of ſeeing a fall of rain or ſnow, or a great quantity of ice, ſhews that there is a redundance of phlegm in the body; he who fancies himſelf converſant among ſtinks, may be aſſured that he harbours ſome putrid matter in his body; to have red things repreſented before you in ſleep, denotes a redundance of blood; if the patient dreams of ſeeing the ſun, moon, and ſtars, hurry on with prodigious ſwiftneſs, it indicates an approaching delirium; to dream of a turbid ſea, indicates diſorders of the belly; and to dream of ſeeing the earth overflowed with water, or of being immerged in a pond or river, indicates a redundance of watery humours in the body; to dream of ſeeing the earth burnt or parched up, a ſign of great heat and drineſs; the appearance of monſters and frightful enemies, indicates deliriums in diſeaſes; and to dream often of being thrown down from ſome very high place, threatens an approaching vertigo, or ſome other diſorder of the head, as an epilepſy, apoplexy, or the like. Theſe and a great many others are the obſervations of Hippocrates on the dreams of his patients. From thoſe and from ſome farther aſſiſtances, Lomnius has carried the ſubject to a very great length, and given many rules of judging from them.

DREDGE, or Dreg, among farmers, denotes oats and barley mingled together.

DREDGERS, the term uſed in the admiralty-court for the oyſter-fiſhers.

DREIN, in the military art, a trench made to draw the water out of a moat, which is afterwards filled with hurdles and earth, or with faſcines, or bundles of ruſhes and planks, to facilitate the paſſage over the mud. See the article Trenches.

DRENCH, among farriers, a phyſical potion for horſes. The ingredients for this purpoſe are to be beat coarſely, and either mingled with a decoction, or with wine. Then let all infuſe about a quarter of an hour, and give it to the horſe with a horn, after he has been tied up two hours to the rack.

DRESDEN, the capital of upper Saxony, in Germany, ſituated on the river Elbe, ſixty-five miles north-weſt of Prague, and eighty-five ſouth of Berlin: eaſt long. 13° 36′, north lat. 51°.

It is one of the largeſt and ſtrongeſt towns in Germany, and is the uſual reſidence of the elector of Saxony.

DRESSING *of hemp and flax.* See the articles Hemp and Flax.

Dressing *of hops.* See the article Hop.

Dressing *of meats*, that part of cookery which regards animal foods, whether fleſh or fiſh.

Dressing *of ores*, the breaking and powdering them in the ſtamping-mill, and afterwards waſhing them in a wooden trough. See Washing *of Ores*.

Dressing, in ſurgery, the treatment of a wound or any diſordered part. The apparatus of dreſſing conſiſts of doſſils, tents, plaſters, compreſſes, bandages, bands, ligatures, and ſtrings. See the articles Wound, Dossil, Tent, Plaster, &c.

DREUX, a town of Orleanois, in France, ſeventeen miles north of Chartres, and thirty-five weſt of Paris.

DRIFT *of the foreſt*, is an exact view and examination taken at certain times to know what beaſts are there; in order that none may come on the foreſt but ſuch as have right; and that the foreſt be not overcharged with beaſts.

DRIFT, in mining, a paſſage cut out under the earth, betwixt ſhaft and ſhaft, or turn and turn; or a paſſage or way, wrought under the earth, to the end of a meer of ground, or part of a meer.

DRIFT SAIL, a ſail uſed under water, veered out right a head by ſheets, as other ſails are. It ſerves to keep the ſhip's head right upon the ſea in a ſtorm, and to hinder her driving too faſt in a current.

DRILL, in mechanics, a ſmall inſtrument for making ſuch holes as punches will not conveniently ſerve for. Drills are of various ſizes, and are chiefly uſed by ſmiths and turners.

DRILL, or **DRILL-BOX**, a name given to an inſtrument for ſowing land in the new method of horſe-hoeing huſbandry. It plants the corn in rows, makes the channels, ſows the ſeeds in them, and covers them with earth when ſown; and all this at the ſame time, and with great expedition. The principal parts are the ſeed box, the hopper, the plough and its harrow, of all which the ſeed-box is the chief. It meaſures, or rather numbers, out the ſeeds which it receives from the hopper, and is for this purpoſe as an artificial hand; but it delivers out the ſeed much more equally than can be done by a natural hand. See the article PLOUGH. Whoever is deſirous of knowing more intimately the whole apparatus for this method of ſowing, may ſee it fully deſcribed, and illuſtrated with figures, by Tull, in his *Horſe-hoeing huſbandry*.

DRINK, a part of our ordinary food in a liquid form, ſerving to dilute and moiſten the dry meat. See the article DIET.

The drinks in different countries are different. The common drink in England is either water, malt-liquor, wine, or mixtures of theſe.

The firſt drinks of mankind were certainly water and milk, but the love of luxury and debauchery ſoon introduced the art of preparing intoxicating and inebriating drinks out of vegetables. The vine gave the firſt of theſe liquors; after this, wheat, barley, millet, oats, rice, apples, pears, and pomegranates; and after thoſe the juices drained from the pine, ſycamore, and maple, were brought to this uſe: in latter times, roots, berries, and the pith of the ſugar-cane, have been employed for the ſame purpoſes. Honey alſo is in ſome repute, and before the uſe of the things above-mentioned, the vinous liquor made of honey and water, was in the very higheſt eſtimation. It is acknowledged by many phyſicians, that among the ſtrong drinks, wine is the moſt pernicious; and that good water, milk, beer, and cyder, are greatly preferable to it; none of them bringing on the variety of diſorders to which immoderate wine-drinkers are ſubject, ſuch as decay of ſight, trembling of the limbs, *&c.*

Of all drinks, water is the leaſt flatulent, becauſe the unelaſtic air lodged in it, cannot be extricated by the heat of the body, ſo as to become elaſtic. The moſt flatulent of all drinks, are theſe taken in the act of fermentation; as for example, the ale which is cloſe ſhut up in very ſtrong bottles, and flies out with the greateſt force upon opening them; for by an imprudent uſe of ſuch, the moſt ſevere colic, iliac paſſion, and cholera morbus, frequently enſue. Next to theſe come ſuch drinks as have not yet fermented, but are ſoon ſet to work by the heat of the body; as for example, muſt, new wine, or ale, wherein no bitter herbs, ſuch as hops, wormwood, *&c.* have been boiled as a preſervative.

Dr. Bryan Robinſon thinks that the proportion of meat to drink, ought to be ſuch as ſhall make perſpiration and urine nearly equal at all ſeaſons of the year.

DRIP, in architecture. See LARMIER.

Drips are uſed in building for a certain kind of ſteps made on flat roofs to walk upon, a way of building much uſed in Italy, where the roof is not made quite flat, but a little raiſed in the middle, with drips or ſteps lying a little inclined to the horizon. See the article ROOF.

DRIVERS, among ſportſmen, a machine for driving pheaſant-powts, conſiſting of good ſtrong ozier-wands, ſuch as the baſket-makers uſe; theſe are to be ſet in a handle, and twiſted or bound with ſmall oziers in two or three places.

With this inſtrument, the ſportſman drives whole eyes of young powts into his nets. See the next article.

DRIVING, among ſportſmen, a method of taking pheaſant-powts. It is thus: the ſportſman finds out the haunts of theſe birds; and having fixed his nets there, he calls them together by a pheaſant-call, imitating the voice of the dam: after this he makes a noiſe with his driver, which will make them run a little way forward in a cluſter; and this he is to repeat till he has made ſure of them, which an expert ſportſman never fails to do, by driving them into his nets.

DRIVING, in metallurgy, is ſaid of ſilver, when in the operation of refining, the lead being burnt away, the remaining copper riſes upon its ſurface in red fiery bubbles. See the article SILVER.

DRIVING, in the ſea-language, is ſaid of a ſhip when an anchor being let fall will not hold her faſt, nor prevent her ſailing away with the tide or wind. The beſt help in this caſe is to let fall more anchors, or to veer out more cable; for the more cable ſhe has out, the ſafer ſhe rides. When a ſhip is a-hull or a-try, they ſay ſhe drives to leeward.

DRIVE-BOLTS, in ſhip-building. See the article BOLT.

DROCK, in huſbandry, the upright piece of timber on the right ſide of a plough's tail, to which is fixed the earth-board. See the article PLOUGH.

DROGHEDA, a port-town of Ireland, twenty three miles north of Dublin.

DROIT, *jus*, ſignifies right or law, of which ſome diſtinguiſh ſix kinds. 1. Jus recuperandi, right of recovery. 2. Jus entrandi, right of entering. 3. Jus habendi, right of having. 4. Jus retinendi, right of retaining. 5. Jus percipiendi, right of receiving. 6. Jus poſſidendi, right of poſſeſſing. See the articles ENTRY, POSSESSION, and RECOVERY.

DROIT is alſo the higheſt writ of all other real writs, and takes its name of a writ of right, from the greateſt regard being ſhewn to it; and as it has the moſt aſſured and final judgment. There are ſeveral ſorts of theſe writs uſed in our law, as droit de avowſon, droit de dower, droit de garde, droit patent, droit rationabili parte, and droit ſur diſclaimer. See the article RECTO.

DROITWICH, a borough ſix miles north of Worceſter, which ſends two members to parliament.

DROMEDARY, *dromedarius*, a large animal of the camel kind, with only one bunch on its back, it is taller than the horſe, and has a much longer and ſlenderer neck: its ears are ſhort, and the upper lip is divided in the manner of that of the hare: It is a native of Aſia, and more uſed for riding on, than for carrying heavy loads. See plate LXXIX. fig. 4.

DRONE, in the hiſtory of inſects, a kind of bee, larger than the common working or honey-bees: it is ſo called from its idleneſs, as never going abroad to collect either honey or wax. See BEE.

The number of theſe drones in a hive is more or leſs, according to the ſeaſon and age of the ſwarm. In a full hive, they ſometimes amount to five or ſix hundred, or even a thouſand.

DRONE-FLY, a two-winged inſect, extremely like the common drone-bee, whence alſo the name.

DROPAX, an external medicine uſed by the antients for inducing a redneſs upon a part, and alſo for taking off the hairs from the body. It was either ſimple or compound. The ſimple conſiſts of pitch and wax. The compound dropax, beſides pitch and wax, admits pepper, bitumen, roſemary-ſeed, and euphorbium. It was uſed in the form of a plaſter, or cataplaſm.

DROPPING, or DRIPPING, among falconers, is ſaid of a hawk which mutes directly downwards in ſeveral drops, not yerking her dung ſtraight forwards.

DROPS, in architecture, an ornament in the doric entablature repreſenting drops, or little bells immediately under the triglyphs.

DROPS, in meteorology, ſmall ſpherical bodies which the particles of fluids ſpontaneouſly form themſelves into, when let fall from any height. This ſpherical figure, the newtonian philoſophers demonſtrate to be the effect of corpuſcular attraction, for conſidering that the attractive force of one ſingle particle of a fluid is equally exerted to an equal diſtance, it muſt follow that other fluid particles are on every ſide drawn to it, and will therefore take their places at an equal diſtance from it, and conſequently form a round ſuperficies. See the articles ATTRACTION, FLUID, and RAIN.

DROPS, in medicine, a liquid remedy, the doſe of which is eſtimated by a certain number of drops.

DROPS *of life*, *guttæ vitæ*, a tincture produced from opium, engliſh ſaffron, ruſſia caſtor, cochineal, and Virginia-ſnake-root, nutmegs, zedoary, and camphire, with the tincture of antimony. This medicine, though not commonly met with, is accounted one of the beſt preparations of the kind. It promotes ſweat very much, and is wonderfully carminative. The doſe is from ten to forty, fifty, or ſixty drops.

Engliſh DROPS, *guttæ anglicanæ*, a name given to a chemical preparation eſteemed of great virtue againſt vapours, and lethargic affections, and purchaſed at 5000 l. by king Charles II. from the inventor Dr. Goddard. The medicine appeared to be only a ſpirit drawn by the retort from raw ſilk, and afterwards rectified with oil of cinnamon, or any other eſſential oil, and was in reality no better than the common ſal volatile oleoſum, or any of the volatile ſpirits impregnated with an eſſential oil, except that it was leſs diſagreeable than any of them to the taſte.

DROPSY, υδρωψ, in medicine, an unnatural collection of watry humours in any part of the body.

Dropſies are of various kinds, but thoſe moſt common are the anaſarca, aſcites, and tympanites. See the article ANASARCA, *&c.*

Among the cauſes of theſe diſeaſes may be reckoned a family or conſtitutional diſpoſition thereto; a haſty drinking cold water in too large quantities; a ſtoppage of the natural diſcharges of perſpiration and urine; a lienterious diſorder of long continuance; all obſtinate obſtructions of the viſcera; the jaundice, diarrhœa, dyſentery, coeliac paſſion, and gout; drinking ſharp, fermented, and ſpirituous liquors; and the like.

As to the ſymptoms, the feet and legs firſt ſwell; and when theſe are diſtended to the utmoſt, the waters ruſh into the abdomen, and cauſe it to ſwell by little and little, till at length the more noble viſcera are affected thereby, and the patient is ſoon overwhelmed with the deluge. In proportion as the diſeaſed parts increaſe in bulk, the reſt fall away; and at the ſame time, the difficulty of breathing, and other ſymptoms grow more intolerable.

When the abdomen is ſwelled, it will reſound when ſtruck, if the diſeaſe be a tympany; and if an aſcites, the noiſe of the fluctuating waters is heard. Beſides theſe ſymptoms, the patient is alſo afflicted with a heavineſs, ſtupor, coſtiveneſs, and at length with a ſlow fever. The waters too, after being long pent up in a cloſe place, grow acrimonious; and hence ulcers, gangrenes, bleeding at the noſe, a mortification of the viſcera, and death.

In the anaſarca, as well as in the more advanced ſtages of a dropſy, the chief indications of cure, are to reſtore the humours to their natural fluidity, invigorate the languid circulation, brace up and ſtrengthen the relaxed ſolids, promote the ſecretions, and carry off the redundant ſtagnating juices. To this purpoſe, draſtic purges, ſteel-medicines, abſorbents, detergents, and ſtomachics, are recommended. A briſk purge ſhould be taken early every morning, or every other day, according to the ſtrength of the patient, till the ſwelling of the parts affected abate.

Elaterium, and antimonial wine, are ſaid to be excellent for dropſical patients, who are not eaſily purged; two grains of the former being a proper doſe for moſt conſtitutions; and of the latter, or antimonial wine, a dram and a half, or two drams, may be taken every morning: this frees the abdomen from the load of waters. Some greatly recommend Bontius's pills, the doſe of which is from half a ſcruple to a ſcruple. Mercurius dulcis, and the juice of the root of iris paluſtris lutea are alſo recommended: eighty drops of this laſt may be given every hour in a little ſyrup of buckthorn.

As to cathartics, the ſlow ones are rather hurtful than beneficial; and therefore, the purge had better be too ſtrong than too weak, that the waters may be carried off with as much ſpeed as the patient's ſtrength will bear. When the patient is of a very weakly conſtitution, it is proper to omit all purgatives, and give diuretics, and the lixivial ſalts in their ſtead, eſpecially nitre. Some alſo have been cured by a pertinaceous abſtinence from all liquids, excepting a little rich wine.

When the waters are by theſe means carried off, the tone of the debilitated viſcera ſhould be reſtored by the uſe of wines, ſteel, and ſuch ſtrengtheners as are greatly aſtringent; in which caſe, purging muſt be omitted, as alſo during the uſe of the lixivial ſalts; but ſtrengtheners may be properly uſed with theſe laſt.

For the operation of tapping for the dropſy, called by ſurgeons paracenteſis. See the article PARACENTESIS.

DROP-WORT, in botany, the ſame with filipendula. See FILIPENDULA.

Water DROP-WORT, the engliſh name of a plant, called by authors oenanthe. See the article OENANTHE.

DROSERA, SUN-DEW, in botany, a genus of the pentandria-pentagynia claſs of plants, with a funnel-faſhioned flower, conſiſting of five obtuſely-ovated petals: the fruit is an unilocular, ſuboval capſule, containing a great many very ſmall ſeeds.

DROUGHT, in the hiſtory of the air, a long continuance of dry weather.

Great droughts are often very prejudicial to the farmer, unleſs the lands lie very low, and are well ſupplied with water, or defended from the ſcorching heat of the ſun by tall incloſures. See the article INCLOSURE.

The laſt of theſe is always in the farmer's power, and ſhould be carefully provided by planting hedges in a proper manner, in counties moſt ſubject to ſuffer by this diſadvantage. The other is not always ſo eaſy, but may be managed ſeveral ways, as by ſinking wells; but theſe, when deep, are very expenſive; or by bringing the water in pipes, gutters, or other conveyances: and this is eaſily done where there is a ſpring or brook in the neighbourhood higher than the lands. Pumps, wheels, and ſuch other engines are alſo uſed in ſome places to bring on the water; and in others, ponds, ciſterns, and receptacles are made to take in the rains and winter floods, and retain the water till ſummer, when it is wanted.

The farmers of England are very deficient in this laſt method, which they might uſe to their great benefit in many places. In Spain they have no water in many parts but what they preſerve in this manner. And at Amſterdam and Venice they have whole cellars made into ciſterns, which receive the water that falls in rains, and preſerve it all the year. Want of water for the cattle in ſummer in many places might be eaſily remedied by ſome care of this kind, and many thouſand acres of land made uſeful, which are now left as waſte, by this means alone. It is very evident that this is feaſible, becauſe it is done in places where there falls much leſs rain annually than with us; and yet by this the inhabitants have always freſh water enough for the uſe of their houſes, cattle and gardens, none of which ever fail.

DROWNING, the act of ſuffocating, or being ſuffocated, by water.

Naturaliſts and phyſicians furniſh us with divers well atteſted inſtances of ſurprizing recoveries of perſons drowned. It is certain from repeated diſſections made on perſons drowned, that they generally have leſs water in their ſtomachs, than if they had voluntarily drunk a conſiderable quantity: whence it does not ſeem expedient to hang the drowned perſon by the heels, a poſition that muſt prove uneaſy as ſoon as the humours of the body ſhould reſume their ordinary motion. In order to know whether the perſon has ſwallowed too much water, or not, and to make him vomit it up if he has, it is proper to put him in a tun, open at both ends, which is to be rolled in different directions: or the bearded end of a feather ſhould be introduced into the œſophagus. After taking off the cloaths of the drowned perſon, we ought, with the utmoſt expedition, to ſhelter him from the impreſſions of the cold air, and begin to warm him by wrapping him up with cloaths and coverings: to do this more effectually, he is afterwards to be put into a pretty warm bed, applying alſo to his body hot napkins and cloths. A hot ſcorching ſun, to which drowned perſons have been expoſed, and hot baths, have produced the ſame happy effects.

The great intention to be purſued is, to put the ſolid parts of the machine in action, that thus they may reſtore the motion of the fluids: in order to this, the drowned perſon ſhould be agitated in various directions, in a bed, in the arms of perſons of ſufficient ſtrength.

Spirituous liquors ſhould be poured into his mouth; or warm urine; and ſome perſons preſcribe a decoction of pepper and vinegar, as a gargariſm; we muſt alſo attempt to irritate the internal fibres of the noſe, either by volatile ſpirits, and by the liquors uſed in apoplectic caſes; or by tickling the nerves of the noſtrils with a bearded feather, or by blowing through a quill, ſnuff, or ſome other more powerful ſternutatory. One of the means frequently uſed with ſucceſs, is to blow warm air, by means of a pipe, into their mouths; or to introduce it by a pair of bellows: or, by injecting warm clyſters, to irritate the inteſtines: the ſmoke of tobacco conveyed into the inteſtines, by means of a tobacco-pipe, is much recommended. Veneſection is by no means to be neglected; and perhaps moſt ſucceſsfully in the jugular vein; and when all theſe meaſures prove unſucceſsful, the laſt recourſe is bronchotomy. See the article BRONCHOTOMY.

DRUG, a general term for goods of the druggiſt and grocery kinds, eſpecially for thoſe uſed in medicine and dying.

The principal drugs in medicine make the greateſt part of the wholeſale trade in the druggiſt and ſpicery ways. Some are produced in France, England, *&c.* but the greateſt part is brought from the Levant, and the Eaſt Indies. The chief drugs imported into this kingdom, are from the Eaſt-Indies, being as follows, alum, china-root, camphor, rhubarb, muſk, vermilion, ſoy of japan, ketchup, ſtick-lack, roſam aloes, ſhell-lack, borax, lapis lazuli, galangal, benjamin, aquila-wood, gamboge, putchuck, or coſtus dulcis, dragons blood, cubebs, cardamoins, olibanum, chengue, ſalt-petre, aloe-hepatica, bezoar ſtone, lignum aloes, caſſia, goa-ſtone, opium, unicorn's horn, civet, frankincenſe, tamarinds, turmeric, rock-ſalt, ſaffron, myrrh, manna, renes, tacamahac, ambergreaſe, dammer, coyr, cowries, chank, nux vomica, ſnake-ſtone, caſſia lignum, aſſafœtida, dry ginger, long pepper, tyncal, ſago, lapis tutiæ, wormſeed, galbanum, gum-elemi, ammoniacum, tragacanth. See the articles ALUM, CHINA ROOT, *&c.*

Drugs for dying are of two principal ſorts, *viz.* drugs that do not give any colour of themſelves, but prepare the ſtuff to take the dye, or make the colours more lively and ſtrong; and drugs that colour.

Of the firſt ſort are alum, tartar, arſenic, realgal, ſalt-petre, nitre, ſal-gem, ſal-armoniac, common ſalt, mineral ſalt, ſalt of cryſtal, of tartar, agaric, ſpirit of wine, urine, pewter, bran, ſtarch, *&c.* Some of the colouring drugs are wood, indigo, ſcarlet wood, logwood, ironwood, *&c.* ſcarlet grain, cochineal, madder, goats hair, greening weed, ſavory, chimney-ſoot, *&c.*

There are other drugs uſed in common by both, which colour either faintly, or very much, as the root, bark, and leaf of the walnut-tree, the rind of the nut, gall-nuts, ſumach, copperas, *&c.*

DRUG is uſed to ſignify things of little value expoſed to ſale.

DRUG, among fan-makers, is a compoſition of gum arabic, and ſome other ingredients uſed in laying gold or ſilver leaf upon fans; or, in covering them with either of theſe metals in powder. They uſe it alſo to paſte together the papers, gawzes, taffeta's, and other like matters, uſed by them in their fans.

DRUG ſignifies alſo a ſalt, or cinder of glaſs, uſed by ſome in bleaching cloth. The uſe of this drug is prohibited in France, as being found corroſive, deſtructive of the linen, and capable of hurting the health of thoſe who uſe it. See the article BLEACHING.

DRUGS of the french dominions pay for every 20 s. value of their reſpective rates (a few excepted) on importation, 4 s. $9\frac{75}{100}$ d. and draw back on exportation 4 s. $4\frac{05}{100}$ d. If for dyer's uſe, they pay 6 s. $7\frac{65}{100}$ d. and draw back 6 s. $1\frac{05}{100}$ d. Drugs of the growth, product or manufacture of France for every 20 s. value of their reſpective rates (ſome excepted) pay 6 s. $5\frac{75}{100}$ d. and draw back 4 s. $4\frac{05}{100}$ d. but if for dyer's uſe, they pay 11 s. $7\frac{65}{100}$ d. and draw back 6 s. $1\frac{95}{100}$ d. All drugs imported from the britiſh plantations, in britiſh built ſhipping, notwithſtanding they come from the ſpaniſh Weſt-Indies to ours, ſhall pay as from the place of growth and no otherwiſe.

DRUGGET, in commerce, a ſtuff ſometimes all wool, and ſometimes half wool half thread, ſometimes corded, but uſually plain.

Thoſe that have the woof of wool, and the warp of thread, are called threaded druggets; and thoſe wrought with the ſhuttle on a loom of four marches, as the ſerges of Moui, Beauvois, and other like ſtuffs, corded, are called corded druggets. As to the plain, they are wrought on a loom of two marches, with the ſhuttle, in the ſame manner as cloth, camlets, and other like ſtuffs, not corded.

DRUIDS, the prieſts or miniſters of religion of the antient Britons, and Gauls. The druids were choſe out of the beſt families; and were held, both by the honours of their birth, and their office, in the greateſt veneration. They are ſaid to have underſtood aſtrology, geometry, natural hiſtory, politics, and geography: they had the adminiſtration of all ſacred things, were the interpreters of religion, and the judges of all affairs indifferently.

Whoever refuſed obedience to them, was declared impious and accurſed; they held the immortality of the ſoul, and the metempſychoſis; they are divided by ſome into ſeveral claſſes, as the vacerri, bardi, eubagis, ſemnothii, and ſaronidæ: they had a chief, or arch-druid, in every nation;

nation: he was a ſort of high-prieſt, having an abſolute authority over the reſt, and was ſucceeded by the moſt conſiderable among his ſurvivors. The youth uſed to be inſtructed by them, retiring with them to caves, and deſolate foreſts, where they were ſometimes kept twenty years. They preſerved the memory and actions of great men by their verſes; but are ſaid to have ſacrificed men to Mercury. Cæſar imagined that the druids came from Britain into Gaul, but ſeveral among the modern writers are of a different opinion.

DRUM, *tympanum*, is a military muſical inſtrument in form of a cylinder, hollow within, and covered at the two ends with vellum, which is ſtretched or ſlackened at pleaſure by the means of ſmall cords and ſliding knots. It is beat upon with ſticks. Some drums are made of braſs, but they are commonly of wood.

There are ſeveral beats of the drum, as aſſembly, chamade, reveillé, retreat, *&c.* See ASSEMBLY, CHAMADE, *&c.*

Kettle DRUMS, are two ſorts of large baſons of copper or braſs, rounded in the bottom, and covered with vellum or goat-ſkin, which is kept faſt by a circle of iron, and ſeveral holes faſtened to the body of the drum, and a like number of ſcrews to ſcrew up and down. They are much uſed among the horſe, as alſo in operas, oratorios, concerts, *&c.*

DRUM, or DRUMMER, he that beats the drum, of whom each company of foot has one, and ſometimes two. Every regiment has a drum-major, who has the command over the other drums. They are diſtinguiſhed from the ſoldiers, by cloaths of a different faſhion: their poſt when a battalion is drawn up, is on the flanks, and on a march it is betwixt the diviſions.

DRUM *of the ear*, in anatomy. See the article EAR.

String of the DRUM. See CHORD.

DRUM, in architecture. See TAMBOUR.

DRUMLANERK, a town of Scotland, in the county of Nithſdale, ſituated on the river Nith, fifteen miles from Dumfries: weſt long. 3° 33′, north lat. 55° 13′.

DRUNGUS, a name given in the latter times of the roman empire to a body of troops, amounting from one thouſand to four thouſand men. At firſt it was uſed to denote the troops of ſtrangers and enemies, but in the eaſtern empire to ſignify the troops of the empire itſelf.

DRUNKENNESS, *ebrietas*, phyſically conſidered, conſiſts in a preternatural compreſſion of the brain, and a diſcompoſure of its fibres, occaſioned by the fumes or ſpirituous parts of liquors. It is accounted for thus, an immoderate quantity of wine taken into the ſtomach, is there heated and undergoes a kind of effervescence, which happens the more readily, as the liquor abounds more in ſulphur. By this action it becomes rarefied, ſo that, the groſſer parts being left behind, its finer parts ſhoot through the veins to the brain; or are conveyed through the veins to the heart, whence, after a farther heat of rarefaction, they are ſent through the carotid arteries, *&c.* to the brain. Hence neceſſarily ariſes a repletion of the meninges, and a compreſſion of the fibres of the brain, from the freſh ſtock of rarefied ſulphur continually exploded into them: hence it is that all liquors will not give drunkenneſs; but ſuch only as by their ſulphur or ſpirit are diſpoſed for an effervescence in the ſtomach and heart to diffuſe their ſubtile parts plentifully to the brain. Drunkenneſs appears in different ſhapes, in different conſtitutions. Some it makes gay, ſome ſullen, and ſome furious. Hobbes makes voluntary drunkenneſs a breach of the law of nature, which directs us to preſerve the uſe of our reaſon. The law of England does not allow it to be an excuſe in any caſe whatſoever. On the contrary, it is puniſhable, the penalty being five ſhillings fine, or the ſtocks, in caſe of non-payment.

DRUPE, among botaniſts, a kind of pericarpium, conſiſting of a ſoft, fleſhy, and ſucculent pulp, with a nucleus, or kernel in its center.

DRUSENHEIM, a town of Alſace, in Germany, ſituated on the weſt ſide of the Rhine, four miles ſouth-eaſt of Hagenau: eaſt long. 8°, north lat. 48° 40′.

DRY BATHS,	See	BATH.
DRY CONFECTS,		CONFECTS.
DRY DOCK,		DOCK.

DRY CUPPING, in ſurgery. See CUPPING.

DRY MEAT, in the manege, is uſed for corn and hay. After taking the horſe from graſs he is houſed, and put to dry meat.

DRY MEASURE,	See the articles	MEASURE.
DRY MOAT,		MOAT.
DRY RENT,		RENT.
DRY SPAVIN,		SPAVIN.
DRY STORAX,		STORAX.
DRY SUTURE,		SUTURE.

DRYADS, *dryades*, in the heathen theology, a ſort of deities, or nymphs, which the antients thought inhabited groves and woods. They differed from the Hamadryades, theſe latter being attached to ſome particular tree, with which they were born, and with which they died; whereas the Dryades were goddeſſes of trees and woods in general.

We likewiſe find mention made of a kind of propheteſſes, or witches, among the Gauls, called dryades or druids. See the the article DRUIDS.

DRYAS, in botany, a genus of the icoſandria-pentagynia claſs of plants, the flower of which conſiſts of eight oblong, emarginated, patent petals, inſerted into the cup. There is no pericarpium, but the ſeeds are numerous, of a roundiſh compreſſed figure, and furniſhed with very long hairy ſtyles.

DRYPIS, a genus of the decandria-trigynia claſs of plants, the corolla whereof conſiſts of five petals, their ungues are of the length of the cup, and narrow; the limb is plane; the bracteæ are divided into two linear obtuſe ſegments; the fruit is a ſmall, globoſe, covered capſule, with only one cell, in which is a ſingle kidney ſhaped ſeed.

DUAL *number*. See the article NUMBER.

DUBLIN, the capital of the province of Leinſter, and of all Ireland, ſituated at the mouth of the river Liffee, ſixty miles weſt of Holyhead in Wales: weſt long. 6° 25′, north lat. 53° 16′.

It is a large and beautiful city, pleaſantly ſituated; having a view of the ſea on one ſide, and of a fine country on the other. It is the ſeat of the courts of juſtice, and an archbiſhop's ſee; and has a noble college, which is an univerſity of itſelf.

DUCAL, in general, ſomething belonging to a duke. See the article DUKE.

DUCAT, a coin current in Germany, and other countries abroad, for the different values of which ſee COIN.

DUCATOON, a ſilver coin, likewiſe frequent in ſeveral parts of Europe. See the article COIN.

DUCENARIUS, in roman antiquity, a military officer, who had the command of two hundred men.

The title ducenarii is alſo given to certain procurators of the emperors, ſo called either from their having a ſalary of 200 ſeſterces, or from their being appointed to raiſe the tax of the two hundredth penny.

DUCES TECUM, in law, a writ that commands a perſon to appear in the court of chancery, and bring with him certain writings, evidences, or other things, which the court is inclined to view.

DUCES *tecum licet languidus*, in law, is a writ directed to the ſheriff on a return, that he is not able to bring his priſoner without danger of death, he being *adeo languidus*: upon which the court grants a habeas corpus, in nature of a *duces tecum licet languidus*.

DUCK, *anas*, in ornithology, is characterized in general under the article ANAS.

There are two ſorts of ducks common with us, the tame and wild; whereof the firſt is very beneficial to the huſbandman, and at the ſame time requires no charge to keep, living on loſt corn, worms, ſnails, &c. Indeed once a year this fowl is a great layer of eggs, and when ſhe ſits, muſt be carefully fed with barley or other grain. As to the ducklings, they are fed in the ſame manner as goſlings, and may be fattened in three weeks time, by giving them any kind of pulſe, or grain, and plenty of water.

For preſerving wild ducks, a place (with a pond in it) muſt be walled in, and covered a-top with a ſtrong net: the pond is to be ſet with turfs of oziers, and have many ſecret holes and creeks, whereby they will be induced to feed freely, though impriſoned. Teals, widgeons, ſhell-drakes, and green plovers, may alſo be ordered in the ſame manner.

Of exotic or foreign ducks, authors deſcribe a great many ſpecies, as the muſcovy-duck, with a naked papilloſe face, the tufted duck, the braſilian duck, as large as a gooſe, St. Cuthbert's duck, the forked-tailed duck, the black duck, &c. See plate LXXX. fig. 1. where n° 1. repreſents the little black and white duck, ſomewhat leſs than the common kind; and n° 2. the ſummer duck of Mr. Cateſby, likewiſe leſs than the common duck: it has a double plume or creſt, the uppermoſt of a ſhining green, and the under one of a dark, ſhining purple colour.

DUCKER, or DOUCKER, a particular kind of game-cock, that in fighting runs about the clod almoſt at every blow he gives.

This is alſo a name given to the colymbus, or diver. See COLYMBUS.

DUCKING, plunging in water, a diverſion antiently practiſed among the Goths, by way of exerciſe; but among the Celtæ, Franks, and antient Germans, it was a ſort of puniſhment for perſons of ſcandalous lives.

They were ſhut up, naked to the ſhift, in an iron cage, faſtened to the yard of a ſhaloop, and ducked ſeveral times.

DUCKING *at the main-yard*, among ſeamen, is a way of puniſhing offenders on board a ſhip; and is performed by binding the malefactor, by a rope, to the end of the yard, from whence he is violently let down into the ſea, once, twice, or three times, according to his offence: and if the offence be very great, he is drawn underneath the keel of the ſhip. which they call keel-haleing.

DUCKUP, at ſea, is a term uſed by the ſteer's-man, when the mainſail, foreſail, or ſpritſail, hinders his ſeeing to ſteer by a land-mark: upon which he calls out, *duckup the clew lines of theſe ſails*, that is, hale the ſails out of the way. Alſo, when a ſhot is made by a chaſe-piece, if the clew of the ſpritſail hinders the ſight, they call out, *duck up*, &c.

DUCT, DUCTUS, in general, denotes any tube or canal.

It is much uſed by anatomiſts, who mention the adipoſe ducts, concerning the reality of which authors are not agreed; the thoracic, or chyliferous duct; the excretory ducts of the glands; the hepatic duct, or porus bilarius; the ſalival ducts; the lachrymal ducts; the ductus communis choledochus, *&c.* concerning all which it is to be obſerved, that their uſe is to convey certain animal fluids ſecreted in the glands of the parts to which they ſeverally belong: thus it is, the ſalival ducts diſcharge the ſaliva, or pellucid liquor, ſecreted in the glands of the mouth; and ſo of the reſt.

Air-DUCT, among ichthyologiſts, a canal reaching from the air-bladder in fiſhes to their ſtomach. See AIR BLADDER.

Alimentary DUCT, an appellation uſed by ſome for the whole canal of the inteſtines, reaching from the mouth to the anus.

DUCTILITY, in phyſics, a property of certain bodies, whereby they are capable of being expanded, or ſtretched forth, by means of a hammer, preſs, *&c.*

The vaſt ductility of ſome bodies, eſpecially gold, is very ſurpriſing: the gold-beaters and wire-drawers furniſh us with abundant proofs of this property; they, every day, reduce gold into lamellæ inconceivably thin, yet without the leaſt aperture, or pore diſcoverable, even by the microſcope: a ſingle grain of gold may be ſtretched under the hammer, into a leaf, that will cover a houſe, and yet the leaf remain ſo compact, as not to tranſmit the rays of light; nor even admit ſpirit of wine to tranſude. Dr. Halley took the following method to compute the ductility of gold: he learned from the wire-drawers, that an ounce of gold is ſufficient to gild, that is, to cover, or coat, a ſilver-cylinder of forty-eight ounces weight; which cylinder may be drawn out into a wire ſo very fine, that two yards thereof ſhall only weigh one grain; and conſequently ninety-eight yards of the ſame wire, only forty-nine grains: ſo that a ſingle grain of gold here gilds ninety-eight yards; and, of courſe, the ten thouſandth part of a grain is here above one third of an inch long. And ſince the third part of an inch is yet capable of being divided into ten leſſer parts viſible to the naked eye, it is evident that the hundred thouſandth part of a grain of gold may be ſeen without the aſſiſtance of a microſcope. Proceeding in his calculus, he found, at length, that a cube of gold, whoſe ſide is the hundredth part of an inch, contains 2,433,000 000 viſible parts; and yet, though the gold wherewith ſuch wire is coated, be ſtretched to ſuch a degree, ſo intimately does its parts cohere, that there is not any appearance of the colour of the ſilver underneath.

Mr. Boyle examining ſome leaf-gold, found that a grain and a quarter's weight took up an area of fifty ſquare inches; ſuppoſing therefore the leaf divided by parallel lines $\frac{1}{100}$ of an inch apart, a grain of gold will be divided into five hundred thouſand minute ſquares, all diſcernable by a good eye: for gold-wire, the ſame author ſhews, that an ounce of gold drawn out therein, would reach 155 miles and a half.

But Mr. Reaumur has carried the ductility of gold to a ſtill greater length: a gold wire every body knows is only a ſilver one gilt. This cylinder of ſilver, covered with leaf-gold, they draw thro' the hole of an iron, and the gilding ſtill keeps pace with the wire, ſtretch it to what length they can. Now Mr. Reaumur ſhews, that in the common way of drawing gold-wire, a cylinder of ſilver twenty-two inches long, and fifteen lines in diameter is ſtretched to 1,163,520 feet, or is 634,692 lines longer than before,

fore, which amounts to about ninety-ſeven leagues. To wind this thread on ſilk for uſe, they firſt flatten it, in doing which it ſtretches at leaſt $\frac{1}{7}$ farther, ſo that the twenty-two inches are now 111 leagues: but in the flattening, inſtead of $\frac{1}{7}$, they could ſtretch it $\frac{1}{4}$, which would bring it to 120 leagues. This appears a prodigious extenſion, and yet it is nothing to what this gentleman has proved gold to be capable of.

DUEL, a ſingle combat, at a time and place appointed, in conſequence of a challenge. This cuſtom came originally from the northern nations, among whom it was uſual to decide all their controverſies by arms. Both the accuſer and accuſed gave pledges to the judges on their reſpective behalf; and the cuſtom prevailed ſo far amongſt the Germans, Danes and Franks, that none were excuſed from it but women, ſick people, cripples, and ſuch as were under twenty-one years of age, or above ſixty. Even eccleſiaſtics, prieſts, and monks, were obliged to find champions to fight in their ſtead. The puniſhment of the vanquiſhed was either death, by hanging or beheading; or, mutilation of members, according to the circumſtances of the caſe. Duels were at firſt admitted not only on criminal occaſions, but on ſome civil ones for the maintenance of rights to eſtates, and the like: in latter times, however, before they were entirely aboliſhed, they were reſtrained to theſe four caſes: 1. That the crime ſhould be capital. 2. That it ſhould be certain the crime was perpetrated. 3. The accuſed muſt, by common fame, be ſuppoſed guilty. And, 4. The matter not capable of proof by witneſſes. In England, though the trial of duel is diſuſed, the law on which it is founded is ſtill in force. See the article CHAMPION.

DUEL, at preſent, is uſed for a ſingle combat on ſome private quarrel, and muſt be premeditated, otherwiſe it is called a rencounter. If a perſon be killed in a duel, both the principals and ſeconds are guilty of murder, whether the ſeconds engage or not. It is alſo a very high offence to challenge a perſon, either by word or letter, or to be the meſſenger of a challenge. The ſevere edicts made by Lewis XIV. againſt duels, have in a great meaſure put a ſtop to the cuſtom in France.

DUERO, or **DURO**, a large river, which, riſing in Old Caſtile, in Spain, runs from eaſt to weſt, croſſes the province of Leon, and, after dividing Portugal from Spain by a ſoutherly courſe, turns weſtward, croſſes Portugal, and falls into the Atlantic ocean at Porto-Port.

DUKE is either the title of a ſovereign prince, as the duke of Savoy, Parma, &c. the grand duke of Tuſcany, Muſcovy, &c. or it is the title of honour and nobility next below princes. The commanders of armies in time of war, the governors of provinces, and wardens of marches, in time of peace, were called *duces*, under the latter emperors. The Goths and Vandals divided all Gaul into dutchies and counties, the governors of which they ſometimes call *duces*, and ſometimes *comites*. In France, under the ſecond race of kings, though they retained the name and form of ducal government, there were ſcarce any dukes except thoſe of Burgundy, Aquitain, and France. In England, among the Saxons, the commanders of armies, &c. were called dukes, *duces*, without any addition, till Edward III. made his ſon, the black prince, duke of Cornwal; after whom there were more made in the ſame manner, the title deſcending to their poſterity. Duke, then, at preſent, is a mere title of dignity, without giving any domain, territory, or juriſdiction over the place from whence the title is taken. A duke is created by patent, cincture of ſword, mantle of ſtate, impoſition of a cap and coronet of gold on his head, and a verge of gold put into his hand. His title is Grace; and, in the ſtyle of the heralds, Moſt high, potent, high-born, and noble prince.

DUKE, among hebrew grammarians, an appellation given to a ſpecies of accents, anſwering to our comma.

DULCIFYING, in pharmacy, is the ſweetening any matter impregnated with ſalts, by frequently waſhing it in pure water.

DULEDGE, in gunnery, a peg of wood which joins the ends of the ſix fellows that form the round of the wheel of a gun-carriage. The plate of iron on the outſide of the wheel, which ſtrengthens the joint, is called the duledge-plate.

DULL, in the manege. The marks of a dull horſe, called by the French, marquis de ladre, are white ſpots round the eye, and on the tip of the noſe, upon any general colour whatſoever. Though the vulgar take theſe ſpots for ſigns of ſtupidity, it is certain they are great marks of the goodneſs of a horſe; and the horſes that have them are very ſenſible and quick upon the ſpur.

DULWICH, a village near London, remarkable for its mineral waters, which are ſaid to contain a bitter cathartic ſalt, but no iron.

DUMBLAIN, a town of Scotland, in the ſhire of Mentieth, about five miles north o Stirling: weſt long. 3° 45′, north lat. 56°.

DUMBNESS, the deprivation of ſpeech. See the article SPEECH.

Dumbneſs may be owing either to the want, or bad conformation of the tongue. See the article TONGUE.

DUMFERMLING, a parliament-town of Scotland, ſituated in the county of Fife, fifteen miles north-weſt of Edinburgh: weſt long. 3° 20′, and north lat. 56° 15′. Here was formerly a magnificent abbey and palace of the kings of Scotland, in which the princeſs Elizabeth, daughter of King James VI, and mother of the princeſs Sophia, from whom the preſent royal family are deſcended, was born.

DUMFRIES, the capital of a county of the ſame name, in Scotland, lying northwards of the Solway frith: weſt lon. 3° 20′, and north lat. 54° 45′.

DUM *fuit infra ætatem*, is a writ, than an infant, who by feoffment has aliened his lands, may have, when he arrives to full age, for the recovery of what he ſo aliened: and during his non-age, it is ſaid, he may enter on the land, and take it back again; for, by his entry, he ſhall be remitted to his anceſtor's right.

DUM *non fuit compos mentis*, in law, a writ which a perſon who is not ſound in memory, having aliened lands, or tenements, ſhall have againſt the alienee; in which he muſt alledge, that he was not *ſanæ memoriæ*, but being viſited with infirmity, loſt his diſcretion for a time, ſo as not to be capable of making any grant, &c.

DUNBAR, a parliament and port-town of Scotland, about twenty-five miles eaſt of Edinburgh: weſt long. 2° 12′, north lat. 56°.

DUNBARTON, the capital of a county of the ſame name in Scotland, called by ſome Lenox: it is a parliament-town, ſituated at the confluence of the rivers Clyde and Leven; ſixteen miles north-weſt of Glaſgow.

DUNCANNON, a town of the county of Wexford, in Ireland, ſix miles eaſt of Waterford.

DUNDALK, a port-town of Ireland, eighteen miles north of Drogheda: weſt longitude 6° 40′ north latitude 54° 5′.

DUNDEE, a large parliament-town of Angus, in Scotland, ſituated on the north ſide of the frith of Tay, fourteen miles north-weſt of St. Andrews: weſt long. 2° 42′, and north lat. 56° 32′.

DUNG, in huſbandry, is of ſeveral ſorts, as that of horſes, cows, ſheep, hogs, pigeons, geeſe, hens, &c.

All dungs are very enriching to lands; but ſome, as horſe's, ſheep's, pigeon's, &c. being hot and light, are fitteſt for cold lands; as thoſe of cows, hogs, &c. are for hot and dry lands, on account of their cooling qualities; or mixed together in different proportions, they may be made to anſwer for all ſorts of ground. In winter, or rainy weather, it is proper to turn up the dung in as large heaps as poſſible, to prevent the rain's waſhing away its fatneſs and nitrous quality; which purpoſe the dung-meers anſwer extremely well. See the article DUNG-MEERS.

DUNGANNON, a town of Ireland, in the county of Gyrone, and province of Ulſter, ſituated eleven miles north of Armagh: weſt long. 7°, north lat. 54° 28′.

DUNGEON, or DONJON, in fortification. See the article DONJON.

DUNGING *of paſtures*, &c. The beſt time for dunging of paſtures and meadows is in the winter ſeaſon, about January or February, that the rain may waſh the fatneſs of the ſoil to the roots of the graſs before the ſun drives it away. The dung may be ſpread with a bruſh, drawn over the ground like a harrow, before the graſs is too high: and for ruſhy cold land, wood-aſhes, ſea-coal, peat, turf, or the like fuel, is very proper to be laid on. The dung of pigeons, or other fowl, has a better effect here than on any other lands; alſo all hot and ſandy ſoils are fitteſt for this ſort of ground: but for ſuch land of this kind, as is ſandy, or hot, lime, chalk, marl, or any cold ſoils, digged out of the earth, are of ſingular uſe, as well as for corn-lands; ſo is urry in like manner. As for meadows, or grounds of a middle quality between theſe extremes, the ordinary ſoil is beſt. The principal part of good huſbandry conſiſts in a proper application of the compoſt.

DUNKELD, a town of Perthſhire, in Scotland, formerly a biſhop's ſee, ſituated about twelve miles north of Perth.

DUNG-MEERS, in huſbandry, places where ſoils and dungs are mixed and digeſted together. For this purpoſe it is uſual to dig a pit ſufficient to hold the ſtock of ſoil the huſbandman is capable of making; and to prepare it at the bottom with ſtone and clay, that it may hold water, or the moiſture of the dung; and beſides it ſhould be ſo ſituated that the ſinks and drips of the houſes and barns may run into it. Into this pit they caſt refuſe fodder, litter, dung, weeds, *&c.* where they lie and rot together, till the farmer have occaſion for it. Where ſuch a pit is wanting, it is proper to cover the dung with turf, or other ſtuff, to prevent the ſun and wind from drawing off its virtues.

DUNKIRK, a port town of the french Netherlands: eaſt long. 2° 20′, and north lat. 51°.

DUNLIN, in ornithology, a ſmall ſpecies of ſnipe, with the breaſt and throat white, the belly black ſpotted with white, and the upper part of the body red variegated with pretty large black ſpots.

DUNNEGAL, the capital of a county of the ſame name in Ireland, ſituated on a bay, to which it likewiſe gives name: weſt lon. 8° 22′, and north lat. 54° 35′.

DUNNINGTON, a market-town of Lincolnſhire, about twenty-three miles ſouth-eaſt of Lincoln.

DUNS, a market-town of Scotland, twelve miles weſt of Berwick upon Tweed.

DUNSTABLE, a market-town, fifteen miles ſouth of Bedford, and thirty north-weſt of London.

DUNWICH, a borough of Suffolk, forty miles eaſt of Bury.

It ſends two members to parliament.

DUO, in muſic, a ſong or compoſition to be performed in two parts only, one ſung, the other played on an inſtrument, or by two voices.

DUO is alſo when two voices ſing different parts, as accompanied with a third, which is a thorough baſs. It is ſeldom that uniſons and octaves are uſed in duos, except at the beginning and end.

DUODENUM, in anatomy, the firſt of the ſmall guts, ſo called from its length, which is about twelve fingers breadth. It has its origin at the pylorus, or right orifice of the ſtomach; from which aſcending a little, it afterwards deſcends again, and towards its end reaſcends, and runs tranſverſely towards the left kidney: at the diſtance of three or four fingers from the pylorus it receives, at one prominent hiatus or mouth, the choledochic and pancreatic ducts, which diſcharge their reſpective liquors into it. The coats of the duodenum are thicker than thoſe of any other of the ſmall guts, and its cavity is alſo greater than that of any of them. Near its origin it has no valves, nor rugæ or wrinkles; but in its continuation it has very numerous and remarkable ones, called by authors juga. It has alſo the glands of Brunnerus in great number, which ſerve for the ſecreting of a thin aqueous fluid: and it receives an artery from the cœliac, and a vein from the porta.

DUPLE, among mathematicians, an epithet applied to a ratio, where the antecedent term is double the conſequent, or where the exponent of the ratio is 2: thus the ratio of 8 to 4 is a duple ratio.

Sub-DUPLE RATIO is juſt the reverſe of the former, or as 1 to 2. Such is 4 to 8, or 6 to 12.

DUPLICATE, among lawyers, denotes a copy of any deed, writing, or account. It is alſo uſed for the ſecond letters patent, granted by the lord chancellor in a caſe wherein he had before done the ſame. Alſo a ſecond letter written and ſent to the ſame party and purpoſe as the former, for fear of the firſt's miſcarrying, is called a duplicate.

DUPLICATE PROPORTION, or RATIO, is a ratio compounded of two ratios: thus, the duplicate ratio of a to b, is the ratio of $a\,a$ to $b\,b$, or of the ſquare of a to the ſquare of b. Hence the duplicate ratio ought to be well diſtinguiſhed from double.

In a ſeries of geometrical proportionals, the firſt term to the third is ſaid to be in a duplicate ratio of the firſt to the ſecond: thus in 2, 4, 8, 16, *&c.* the ratio of 2 to 8 is duplicate of that of 2 to 4, or as the ſquare of 2 to the ſquare of 4. Duplicate ratio is therefore the proportion of ſquares, as triplicate is of cubes, *&c.* and the ratio of 2 to 8 is ſaid to be compounded of that of 2 to 4, and of 4 to 8.

DUPLICATION, in general, ſignifies the doubling of any thing, or multiplying of it by 2: alſo the folding of any thing back again on itſelf.

The duplication of a cube is a problem famous in antiquity: it was propoſed by the oracle at Delphos, as a means to ſtop the plague, to double Apollo's altar, which was cubical.

The difficulty of the problem conſiſts in this, to find the ſide of a cube that ſhall be double in ſolidity to a given cube; which is only to be ſolved by finding two mean proportionals between the ſide of the given cube and double that ſide. Thus, if the given ſide be repreſented by a, its double by b, and the ſide ſought by y; we ſhall have $aa : yy :: y : b$; and making $z = \frac{yy}{a}$, it will be $a : z :: y : b$. So that y, the ſide of the cube ſought, is the ſecond of two mean proportionals between a and b.

DUPLICATURE, among anatomiſts, a term uſed to denote the folds of any membrane, or veſſel: thus we ſay, the duplicatures of the inteſtines, peritonæum, *&c.* See the article INTESTINES.

DUPONDIUS, in antiquity, the weight of two pounds: alſo a piece of money equal to two as's in value. See AS.

DURA MATER, in anatomy, one of the membranes, or menynges, as they are called, which ſurround the brain. See the article BRAIN.

It is a robuſt and thick membrane, compoſed of tendinous fibres, and ſituated immediately under the cranium: its figure and magnitude correſpond exactly to thoſe of the brain. It adheres every where to the ſcull, only more laxly on the upper part than elſewhere; it adheres alſo, tho' not very firmly, to the parts placed under it. It receives arteries from the carotids, beautifully ramified in the manner of ſhrubs. Its veins are of two kinds, ſome as in other parts of the body, and others of a triangular figure, called ſinuſes, for carrying off the blood from the brain. It has nerves for ſenſation, from the fifth and ſeventh pair of the brain.

The dura mater has a motion, ſaid to be peculiar to itſelf, and of a muſcular kind: but it ſeems much more natural to ſuppoſe it owing to the pulſations of the arteries of the brain.

As to the uſes of this membrane, it ſerves in the place of a perioſteum to the internal parts of the ſcull; alſo to defend the brain by its proceſſes, to prevent the compreſſion of its parts; and by its ſinuſes to give warmth to the brain.

DURANCE, a river of France, which falls into the Rhone, a little below Avignon.

DURANTA, in botany, a genus of the didynamia-angioſpermia claſs of plants; the flower is formed of a ſingle petal, with a cylindrical tube and ringent mouth, the upper limb of which is oval, erect, and hollow; and the lower one divided into three parts: the fruit is a roundiſh unilocular berry, covered with the cup: the ſeeds are four, and of an angular figure.

DURATION, an idea which we get by attending to the fleeting and perpetually periſhing part of ſucceſſion; the idea of ſucceſſion being acquired by reflecting on that train of ideas which conſtantly follow one another in our minds, as long as we are awake. The ſimple modes of duration are any different lengths of it whereof we have diſtinct ideas, as hours, days, years, time, eternity, *&c.*

Duration, as marked by certain periods and meaſures, is what we moſt properly call time. See the article TIME.

DURATION *of action*, according to Ariſtotle, is confined to a natural day in tragedy; but the epopoeia, according to the ſame critic, has no fixed time.

DURATION *of an eclipſe*. See ECLIPSE.

Scruples of half DURATION. See the article SCRUPLE.

DURESSE, in law, is where a perſon is wrongfully impriſoned, or reſtrained of his liberty, contrary to law; or is threatened to be killed, wounded, or beaten, till he executes a bond, or other writing.

Any bond, deed, or other obligation, obtained by dureſſe, will be void in law; and in an action brought on the execution of any ſuch deed, the party may plead that it was brought by dureſſe. A deed muſt be avoided by ſpecial pleading, in theſe caſes; for the party cannot plead to it, *non eſt factum*, becauſe it is his deed.

DURHAM, a city and county, in the north of England, ſituated on the river Were, fourteen miles ſouth of Newcaſtle: weſt lon. 1° 12′, and north lat. 54° 50′.

The city of Durham is the ſee of a biſhop, and ſends two members to parliament.

DUSSELDORP, a city of Germany, ſituated on the eaſtern ſhore of the Rhine, twenty miles north of Cologn: eaſt lon. 6° 20′, and north lat. 51° 15′.

DUST is nothing elſe but dry earthy particles, reduced to a fine light powder.

Duſt and ſand will ſometimes get into horſes mouths, and make them loſe their appetites; in which caſe it is proper to give them bran, well moiſtened with water, to cool and refreſh their mouths and tongues.

The Hebrews, when they mourned, put duſt or aſhes upon their heads; and in their afflictions they ſat down in the duſt, and threw themſelves upon the ground.

DUTCHY, in geography, an appellation given to the dominions of a duke. See the article DUKE.

Dutchy-court, a court of the dutchy-chamber of Lancaſter, held at Weſtminſter, before the chancellor of the ſame, for matters concerning the lands and franchiſes of that dutchy. See the article Chancellor.

The proceedings in this court are by engliſh bill, as in chancery. Gwyn ſays, that this court grew out of the grant of king Edw. III. who gave the dutchy to John of Gaunt, and endowed it with royal rights and privileges: ſeveral others of our antient kings likewiſe ſeparated this dutchy from the crown, and ſettled it in the natural perſons of themſelves and their heirs; though, in ſucceeding times, it was united to the crown again.

DUTY, in general, denotes any thing that one is obliged to perform.

Duty, in polity and commerce, ſignifies the impoſt laid on merchandizes, at importation or exportation, commonly called the duties of cuſtoms; alſo the taxes of exciſe, ſtamp-duties. *&c.* See the articles Customs, Excise, *&c.*

The principles on which all duties and cuſtoms ſhould be laid on foreign merchandizes, which are imported into theſe kingdoms, are ſuch as tend to cement a mutual friendſhip and traffic between one nation and another; and, therefore, due care ſhould be taken in the laying of them, that they may anſwer ſo good an end, and be reciprocal in both countries: they ſhould be ſo laid as to make the exports of this nation at leaſt equal to our imports from thoſe nations wherewith we trade, ſo that a balance in money ſhould not be iſſued out of Great Britain, to pay for the goods and merchandizes of other countries: to the end that no greater number of our landholders and manufacturers ſhould be deprived of their revenues ariſing from the product of the lands, and the labour of the people, by foreign importations, than are maintained by exportation to ſuch countries. Theſe are the national principles on which all our treaties of commerce with other countries are to be grounded.

To ſhew, ſays the late ſir Matthew Decker, how exciſes, cuſtoms, and ſalt-duties increaſe the expence of the people, and conſequently ruin our trade, the following account may not be improper.

Firſt the duties themſelves. The net produce of the taxes following, was, before the laſt war except one, computed to be, one year with another, as under:

Exciſe, about	£. 2,800,000
Cuſtoms, about	1,700,000
Salt, about	150,000
	4,650,000
The charges of raiſing thoſe duties are about 10 *per cent.*	465,000
Net produce	5,115,000

Secondly, the advanced price of thoſe goods the above duties are laid on. Experience teaches us that a very ſmall duty laid on commodities, raiſes the price of them conſiderably to the conſumer, beyond the groſs duty. By the fees given to officers; by tradeſmens loſs of time in attending upon exciſemen, or at cuſtom-houſes; by taking away a quarter of our traders ſtocks for duties; and forcing them to take as great pains on one quarter of their ſtock laid out in goods, in order to live, as they would on the whole if duty free; by tradeſmens profits on the duty, and advances in all the hands that all taxed goods come through, to the conſumer; as for example, ſuppoſe there ſhould be no other tax but that on leather, let us ſee how many advances that would make on the price of ſhoes.

The grazier lays (1) on the beaſt he fats, his advanced price of ſhoes: he ſells to the butcher, who takes (2) his profit on the grazier's advanced price of the beaſt; and raiſes (3) on the hide his advanced price of ſhoes: he ſells to the tanner, whoſe journeymen raiſe (4) their wages, on account of the advanced price of ſhoes; the tanner pays (5) the tax of two pence per pound on the leather; takes (6) his profit on the before-mentioned five advances, and raiſes (7) his advanced price of ſhoes on the tanned hide; he ſells to the leather-cutter, who takes (8) his profit on the before-mentioned ſeven advances, and raiſes (9) on the hide he cuts, his advanced price of ſhoes; he ſells to the ſhoe-maker, whoſe journeymen raiſe (10) their wages, on account of their advanced price of ſhoes; the ſhoe-maker takes (11) his profit on the before-mentioned ten advances, and raiſes (12) on the ſhoes he makes, the advanced price of the ſhoes he wears; he ſells to the conſumer with all theſe twelve advances, highly magnified beyond the bare duty.

So much for the tax on leather only; but the grazier, butcher, tanner, leather-cutter, and ſhoe-maker, uſe ſoap; that ſoap, like leather, is taxed, and, like that leather tax, muſt be raiſed; but that cauſed twelve advances on our ſhoes;

place therefore twelve advances more on ſhoes, for the ſoap-tax. Theſe tradeſmen uſe candles; twelve advances more for the tax on them; and the ſame for every other tax on neceſſaries. All which duly conſidered, might be computed at above *cent. per cent.* on the groſs produce of the duties; but though the large duties cauſe ſome farther advance on all the goods they are laid on, charged with profit upon profit, through every hand they paſs; yet as they keep not pace with the ſmall-duties, and as all calculations appear fair when moderate, let us abate in the advances, and ſet them down only at 50 *per cent.* 2,557,500.

The amount of the advanced price of the goods theſe duties are laid on, 7,672,500 l. Let us ſee how this 7,672,500 l. circulates through the people, advances the prices of our goods, and conſequently ruins our trade. Firſt, this dearneſs of all neceſſaries, which raiſe the firſt coſt of goods, muſt advance the price of all labour.

The Spectator, n° 200. computes, that the people without property, who work for their daily bread, conſume two thirds of our cuſtoms and exciſes, and therefore they pay two thirds of them and their conſequences. As theſe people live but from hand to mouth, whatever is laid on them they muſt, therefore, ſhift off, or they cannot live; and ſince theſe various taxes have been projected, they muſt earn enough, when they do work, to pay the taxes, the advanced price of taxed goods, and the advanced prices of all other neceſſaries, *viz.* meat, bread, cloathing, or whatever they can uſe, not only for the conſumption of the days they are employed, but for thoſe alſo they are not: therefore they are the cauſe of raiſing the wages of the working people two thirds of 7,672,500 l. the amount of the advanced price of the goods the above duties are laid on, which make 5,115,000 l.

Secondly, the dearneſs of all neceſſaries forces the maſter-tradeſman to raiſe on their cuſtomers the taxes and advances on their conſumption.

The ſame author allows one third conſumption of our cuſtoms and exciſes to people with property; but as thoſe may be divided into two claſſes, *viz.* thoſe in trade, and thoſe out of trade, and the proportion conſumed by each not being aſcertained by any author, they are computed by ſir Matthew at half and half; therefore the maſter-tradeſmen, or people with property in trade, *viz.* merchants, manufacturers, mechanics, farmers, wholeſale dealers, and retailing ſhopkeepers, muſt each lay on the goods they conſume, whether food, cloathing, or utenſils, their one ſixth conſumption of 7,762,500 l. the amount of the advanced price of the goods the above duties are laid on, makes 1,278,750 l.

Thirdly, tradeſmens paying advanced prices on their goods, muſt have advanced profits; for whether they lay out their ſtocks of money on goods that bear their natural value only, or goods that double their value by taxes, ſtill a living profit muſt be obtained in the ſtocks they employ. For the wages of the manufacturer, the mechanic, the labourer, and the expence of the maſter-tradeſman, being of neceſſity raiſed, the firſt coſt of goods muſt be ſo too; and conſidering the various tradeſmens hands that goods paſs thro', from the workman or labourer, to the conſumer, charged with profit upon profit by each of them, the advance thereby made, may, at a moderate rate be computed at 50 *per cent.* to the conſumer on the above two articles, which raiſe the firſt coſt of goods, and makes 3,196,875 l.

People with property, out of trade, their ſixth of 7,672,500 l. the amount of the advanced price of the goods the above duties are laid on, makes 1,278,750 l. and the total advance is 10,869,375 l.

This is part of the amount of the conſequences of raiſing 4,650,000 l. for the government, by our preſent manner of taxing goods.

Our other taxes are, the land-tax; the groſs produce, at 4 s. in the pound, is about 1 960,000 l.

The ſtamps, windows, poſt office, &c. their computed groſs produce about 500,000 l.

The poor's tax is computed, on a middling rate, to equal the land-tax, but muſt be much more when trade is reduced, and the price of proviſions high: however, to reckon it at no more than the land-tax, or 1,960,000 l. General amount of all our taxes, and part of their conſequences, before the laſt war except one, 15,289,375 l.

Let us now ſee the amount of our taxes with regard to our expences: The Britiſh Merchant computes our people at ſeven millions, and their expences at 7 l. per head; but as neceſſaries are grown dearer ſince the year 1713, when he wrote, and the number of people increaſed, let us compute the people at eight millions, and their expences at 8 l. per head, which makes our total expences annually 64,000,000

64,000,000 l. of which the people pay for the taxes and their conſequences, as above, 15,289,375 l. which being ſubtracted, their expences, if untaxed, would be only 48,710,625 l.

15,289,375 l. charged on 48,710,625 l. is a tax of above 31 *per cent.* on the expences of the people, which muſt add a prodigious artificial value to our goods, conſequently render them leſs ſaleable, and ruin our trade.

If it be admitted that foreigners pay on that conſumption a great portion of our taxes, for what goods they take of us; yet if that was originally intended, and expected to continue the ſame, as at the firſt laying on our taxes, it will be the ſtrongeſt argument to the contrary; for as our taxes on neceſſaries are proved to be ſo burdenſome and extenſive, by raiſing the prices of our goods, foreigners take leſs of them yearly; and when the demand is reduced, the people having leſs work, find leſs money to pay, and yet have their taxes proportionably increaſed on them as they loſe their trade: for as the government abates neither expences or taxes, and, if one method of taxing fails, another is tried, what foreigners ceaſe to pay, we muſt: or, in other words, the leſs trade and money, the more taxes; and the more our taxes are, the leſs trade and money we muſt expect.

Through the whole of this work, we have, under the ſeveral articles, as they occurred, generally annexed the principal duties which belong to each as a branch of the royal revenue; and for further information upon this head, we refer the reader to what is ſaid under the articles CUSTOMS, COMPANY, DRAWBACK, EXCISE, *&c.*

In Spain, the duties of exportation and importation amount to about 5 *per cent.* of the value of the goods. In Portugal, the duties of importation on all kinds of goods are at the rate of 18 *per cent,* excepting ſilks, which are at 13 *per cent.* for exportation the duties are only 6 *per cent.* The duties for exportation and importation in Holland, are nearly alike, being about the rate of 5 *per cent.* In Muſcovy they are the ſame, *viz.* 5 *per cent.* At Hamburgh and Bremen the duties are only 1 *per cent.* and at Lubeck but ½ *per cent.* At Venice the duties are 6 ¾ *per cent.* for importation, and the duties of exportation are about 9 *per cent.* At Leghorn the duties are much the ſame as at Venice. In Conſtantinople, Smyrna, Aleppo, and the other ports of the Levant, the duties of exportation and importation, being nearly the ſame, are at 3 *per cent.* In Cairo, Alexandria, and other cities of Egypt, the duties on goods brought in ſhips from Europe, are at 20 *per cent.* but the duties on the goods brought by the caravans from Aſia, are arbitrary, and always high: they pay no duty on exportation, beſides the cuſtom-houſe fee, which is only 1½ *per cent.*

DUTY, in the military art, is the exerciſe of thoſe functions that belong to a ſoldier; with this diſtinction, that mounting guards and the like, where there is no enemy directly to be engaged, is called duty; but their marching to meet and fight an enemy is called going on ſervice.

DUUMVIRATE, an office or dignity of the duumviri. See the next article.

The duumvirate laſted till the year of Rome 388, when it was changed into a decemvirate.

DUUMVIRI, in roman antiquity, a general application given to magiſtrates, commiſſioners, and officers, where two were joined together in the ſame function.

DUUMVIRI CAPITALES were the judges in criminal cauſes: from their ſentence it was lawful to appeal to the people, who only had the power of condemning a citizen to death. Theſe judges were taken from the body of the decuriones; they had great power and authority, were members of the public council, and had two lictors to walk before them.

DUUMVIRI MUNICIPALES, were two magiſtrates in ſome cities of the empire, anſwering to what the conſuls were at Rome: they were choſen out of the body of the decuriones; their office laſted commonly five years, upon which account they were frequently termed *quinquinales magiſtratus.* Their juriſdiction was of great extent: they had officers walking before them, carrying a ſmall ſwitch in their hands; and ſome of them aſſumed the privilege of having lictors, carrying axes and the faſces, or bundles of rods, before them.

DUUMVIRI NAVALES were the commiſſaries of the fleet, firſt created at the requeſt of M. Decius, tribune of the people, in the time of the war with the Samnites. The duty of their office conſiſted in giving orders for the fitting of ſhips, and giving their commiſſions to the marine officers, *&c.*

DUUMVIRI SACRORUM were magiſtrates created by Tarquinius Superbus, for the performance of the ſacrifice, and keeping of the ſibyls books. They were choſen from among the patricians, and held their office for life: they were exempted from ſerving in the wars, and from the offices impoſed on the other citizens, and without them the oracles of the ſibyls could not be conſulted.

DUYIVELAND, or **DIVELAND**, one of the iſlands of Zealand, in the United Provinces, lying eaſtward of Schonen, from which it is only ſeparated by a narrow channel.

DWAL, or **DWALE**, in heraldry, the herb nightſhade, uſed by ſuch as blazon with flowers and herbs, inſtead of metals and colours, for ſable or black.

DWARF, in general, an appellation given to things greatly inferior in ſize to that which is uſual in their ſeveral kinds: thus there are dwarfs of the human ſpecies, dwarf-dogs, dwarf-trees, &c.

The Romans were ſo paſſionately fond of dwarfs, that they often uſed artificial methods to prevent the growth of boys deſigned for dwarfs, by incloſing them in boxes, or by the uſe of tight bandages. In Italy, even at preſent, they waſh young puppies every day with aſtringent liquors, in order to prevent their growth by hardening the parts.

DWARF FRUIT-TREES are propagated by grafting them on a quince-ſtock, about ſix inches above the ground; and when the bud is ſhot ſo far as to have four eyes, it muſt be ſtopped, to give riſe for lateral branches, for which purpoſe the uppermoſt eye ſhould always be left outwards. Apple, pear, plum, and cherry-trees are thus formed into dwarfs, but the ſummer and autumn pears are found to ſucceed beſt.

As to the planting of dwarf-trees, they ſhould be ſet at twenty-five feet ſquare diſtance, and the ground between ſown or planted for kitchen uſe while the trees are young, only keeping at ſome diſtance from their roots: ſtakes alſo ſhould be fixed all round them, to which the branches may be nailed with liſt, and thereby trimmed in an horizontal direction, and prevented from croſſing one another.

DWINA, the name of two large rivers, one of which riſes in Lithuania, and, dividing Livonia from Courland, falls into the Baltic ſea a little below Riga: the other gives name to the province of Dwina, in Ruſſia, diſcharging itſelf into the White ſea, a little below Archangel.

DYADIC ARITHMETIC, the ſame with binary. See the article BINARY.

DYE, in architecture, any ſquare body, as the trunk, or notched part of a pedeſtal; or it is the middle of the pedeſtal, or that part included between the baſe and the corniche, ſo called becauſe it is often made in the form of a cube or dye. See the articles CORINTHIAN ORDER, DORIC ORDER, &c.

DYE is alſo uſed for a cube of ſtone placed under the feet of a ſtatue, and over its pedeſtal, to raiſe and ſhew it the more.

DYER, a perſon who profeſſes the art of dying all manner of colours. See DYEING.

All perſons occupying the trade of dyeing woollen manufactures within the city of London, or ten miles round it, ſhall be ſubject to the inſpection of the company of dyers of London; and the maſter, wardens, and court of aſſiſtants of the ſaid company, may appoint ſearchers within the ſaid limits; and out of theſe limits, juſtices, at their quarter-ſeſſions, may appoint ſuch ſearchers, who taking to their aſſiſtance a conſtable, or other peace-officer, may, at all ſeaſonable times, enter the ſhop or work-houſe of any perſon uſing the trade of dyeing, and ſearch all cloths or other woollen goods to be dyed black or blue; and any perſon oppoſing, forfeits 10 l.

Every perſon dyeing cloths, &c. maddered, and not woaded, ſhall, before delivery, fix a ſeal of lead to them, with the letter M, on forfeiture for every yard, &c. 3 s. 4 d. Any perſon, within England, Wales, or Berwick, dying black any baize or other woollen goods, as madder-blacks, not being dyed throughout with woad, indigo, and madder only, or dyeing any cloths, long-ells, &c. for woaded blacks, not being woaded throughout, ſhall forfeit for every long Bocking-baize, containing ſeventy yards, 44 s. For every Colcheſter-baize, containing thirty-five yards, 22 s. and ſo in proportion for other baize. For every cloth dyed black, not being woaded throughout, containing forty-four yards, 40 s. All woollen goods truly maddered black, ſhall be marked with a red and blue roſe; and all woollen goods truly woaded black, with a blue roſe; and any perſon counterfeiting the ſaid marks, or fixing ſuch to any goods falſely dyed, for maddered or woaded blacks, forfeits 4 l. for every piece ſo marked. Any perſon uſing logwood in dying blue, ſhall forfeit 40 s. for every piece ſo dyed containing forty-four yards.

DYER *of leather*, is an artificer who colours ſkins, either on the one ſide, or on the other, in the cold or hot dye. See the articles COLOUR and LEATHER.

Hat-DYER is ſaid of maſter-hatters, who give themſelves particularly to the dyeing of hats. Though there be but one freedom in this company, the maſters ſeem to be divided into three diſtinct profeſſions, the one making the hats, the other dyeing them, and a third fitting them up, and ſelling them. See HAT.

DYEING, the art of giving a laſting colour to ſilks, cloths, and other ſubſtances, whereby their beauty is much improved, and value enhanced.

This art depends chiefly on three things, *viz.* 1. Diſpoſing the ſurface of the ſtuffs to receive and retain the colours, which is performed by waſhing them in different lyes, digeſting, beating them, &c. in which human urine putrified, a ſharp ſalt of aſhes, divers ſoaps, and galls of animals, are of principal uſe; by means whereof the viſcuous gluten of the ſilk-worms naturally adhering to their threads, is waſhed and cleanſed from them, and thus they become fitted gradually to imbibe the colours. By theſe alſo the greaſy foulneſs adhering to wool and flax is ſcoured off. See CLOTH.

2. So to grind the colours, as that they may enter the body duly prepared, and preſerve their brightneſs undiminiſhed. See COLOUR and COLOURING.

3. The third conſiſts in having beautiful colours.

According to Sir W. Petty's account of what is done in particular trades by the art of dyeing. 1. There is a whitening of wax, and ſeveral ſorts of linen and cotton cloths, by the ſun, air, and reciprocal effuſions of water. 2. Colouring of wood and leather, by lime, ſalt and liquors, as in ſtoves, canes, and marble leathers. 3. Colouring of paper, *viz.* the marbled paper, by diſtempering the colours with ox-gall, and applying them upon a ſtiff gummed liquor. 4. Colouring, or rather diſcolouring, the colours of ſilks, tiffanies, &c. by brimſtone. 5. Colouring of ſeveral iron and copper-works into black with oil. 6. Colouring of leather into gold-colour, or rather ſilver leaves into gold by varniſhes, and in other caſes by urine and ſulphur. 7. Dyeing of marble and alabaſter, with heat and coloured oils. 8. Colouring ſilver into the braſs-colour, with brimſtone or urine. 9. Colouring the barrels and locks of guns into blue and purple, with the temper of ſmall-coal heat. 10. Colouring of glaſs (made of ſands, flints, &c.) as alſo of cryſtals and earthen ware, with the ruſts and ſolutions of metals. 11. The colouring of live hair, as in Poland, horſe and man's hair: as alſo the colouring of furs. 12. Enameling and annealing. 13. Applying colours, as in the printing of books and pictures, and as in making of playing cards, being each of them performed in a different way. 14. Gilding and tinning with mercury, block-tin, ſal armoniac. 15. Colouring of metals, as copper with calamy, into braſs, and with zink or ſpelter into a golden colour, or into a ſilver one with arſenic; and of iron into a reſemblance of copper with hungarian vitriol. 16. Making painters colours by preparing of earth, chalk, and ſlates; as in umber, ochre, cullen-earth, &c. as alſo out of calces of lead, as ceruſe and minium; by ſublimates of mercury and brimſtone, as in vermilion; by tinging whole earths variouſly, as in verdeter, and ſome of the lakes; by concrete juices, or fæculæ, as in gambogium, indigo, pinks, ſap-green, and lakes; as alſo by ruſts, as in verdigreaſe, &c. 17. The applying theſe colours by the adheſion of ox-gall, as in the marble paper aforeſaid; or by gum-water, as by limning; or by clammy drying oils, ſuch as the oils of linſeed, nuts, &c. 18. The watering of tabbies. 19. The colouring of wool, linen, cotton, ſilk, hair, feathers, horn, leather, and the threads and webs of them with woods, roots, herbs, ſeeds, leaves, ſalts, limes, lixiviums, waters, heats, fermentations, macerations, and other great variety of management: an account of all which is a ſhort hiſtory of dyeing.

The materials uſed in the art of DYEING, are iron and ſteel, or what is produced from them, in all true blacks, called ſpaniſh blacks, though not in flanders-blacks, *viz.* they uſe copperas, ſteel filings, and ſlippe; they alſo uſe pewter for Bow-dye ſcarlet, *viz.* they diſſolve bars of pewter in aquafortis; litharge is alſo uſed by ſome, though acknowleged by few to add weight to dyed ſilk. Antimony is much uſed to the ſame purpoſe. Arſenic is uſed in crimſon upon pretence of giving luſtre, although thoſe who pretend not to be wanting in giving luſtre to their ſilks, diſown its uſe. Verdigreaſe is alſo uſed by linen-dyers in their yellow and greeniſh colours; though, of itſelf, it ſtrikes no deeper colour than that of a pale ſtraw. Of mineral ſalts uſed in dyeing, the chief is alum; the true uſe whereof ſeems to be in regard to the fixation of colours. The next mineral ſalt is ſaltpetre, not uſed by antient dyers, and but by few of the modern: nor is it yet uſed but to brighten colours, by back-boiling of them, for which argol is more commonly uſed: lime is much uſed in working blue-vats.

Of the animal family are uſed cochineal, urine of labouring men kept till it be ſtale and ſtinking, honey, yolks of eggs, and ox gall; the uſe of the urine is to ſcour, and help the fermenting and heating of woad; and is uſed alſo in blue-vats inſtead of lime: it diſchargeth the yellow, and therefore is uſed to ſpend weld withal.

Dyers uſe two ſorts of water, *viz.* river and well-water; the laſt, which is harſh, they uſe in reds and other colours wanting reſtringency, and in dyeing materials of the ſlacker contextures, as in callicoe, fuſtian, and the ſeveral ſpecies of cotton-works; but is not good for blues, and makes yellows and greens look ruſty. River-water is more fat and oily, and is therefore uſed in moſt caſes, and muſt be had in great quantities for waſhing and rinſing their cloths after dyeing. Water is called by dyers white liquor; but a mixture of one part bran, and five of river-water boiled an hour and put into leaden ciſterns to ſettle, is what they call liquor abſolutely.

Gums have been uſed by dyers about ſilk, *viz.* gum arabic, tragacanth, maſtic, dragon's blood. Theſe tend little to the tincture, any more than gum in writing-ink, which only gives it a conſiſtence; ſo gum may give the ſilk a gloſſineſs; and, laſtly, to increaſe the weight.

The three peculiar ingredients for black are copperas, filings of ſteel, and ſlippe: the reſtringent binding materials are alder-bark, pomegranate-peels, walnut-rinds and roots, oakenſapling-bark, and ſaw-duſt of the ſame, crab-tree-bark, galls, and ſumac.

The ſalts are alum, ſalt-petre, ſal armoniac, pot-aſhes, and ſtone-lime; among which urine may be enumerated as a liquid ſalt.

The liquors are well and river water, urine, aquavitæ, vinegar, lemon-juice, aquafortis, honey, and molaſſes.

Ingredients of another claſs are bran, wheaten-flour, yolks of eggs, leaven, cummin-ſeed, fenugreek-ſeed, agaric and ſenna.

The ſmectics, or abſterſives, are fuller's earth, ſoap, linſeed-oil, and ox-gall.

The metals and minerals are pewter, verdigreaſe, antimony, litharge, and arſenic.

The colourings are of three ſorts, *viz.* blue, yellow, and red; of which logwood, old fuſtic, indigo, and madder, are the chief.

General obſervations upon DYEING.

1. All materials which of themſelves do give colour, are either red, yellow, or blue; ſo that out of them, and the primitive fundamental colour white, all that great variety which we ſee in dyed ſtuffs doth ariſe.

2. That few of the colouring materials, as cochineal, ſoot, wood-wax, woad, *&c.* are in their outward and firſt appearance of the ſame colour, which by the ſlighteſt diſtempers and ſolutions in the weakeſt menſtrua, they dye upon cloth, ſilk, *&c.*

3. That many of them will not yield their colours without much grinding, ſteeping, boiling and fermenting, or corroſion by powerful menſtrua, as redwood, weld, woad, arnotto, *&c.*

4. That many of them will of themſelves give no colouring at all, as copperas or galls, or with much diſadvantage, unleſs the cloth or other ſtuff to be dyed be as it were firſt covered, or incruſtated with ſome other matter, though colourleſs aforehand, as madder, weld, braſil, with alum.

5. That ſome of them, by the help of other colourleſs ingredients, do ſtrike different colours from what they would of themſelves, as cochineal, brazil, *&c.*

6. That ſome colours, as madder, indigo, and woad, by reiterated tinctures, will at laſt become black.

7. That although green be the moſt frequent and moſt common of natural colours, yet there is no ſimple ingredient now uſed alone to dye green with upon any material; ſap-green being the neareſt, which is uſed by country people.

8. There is no black thing in uſe which dyes black, though both the coal and ſoot of moſt things burnt or ſcorched be of that colour, and the blacker, by how much the matter before being burnt was whiter, as in ivory-black.

9. The tincture of ſome dyeing ſtuffs will fade even with lying, or with the air, or will ſtain with water only, but very much with urine, vinegar, *&c.*

10. Some of the dyeing materials are uſed to bind and ſtrengthen a colour; ſome to brighten it; ſome to give luſtre to the ſtuff

ſtuff; ſome to diſcharge and take off the colour, either in whole or in part; and ſome out of fraud, to make the material dyed, if coſtly, heavier.

11. That ſome dyeing ingredients, or drugs, by the coarſeneſs of their bodies, make the thread of the dyed ſtuff ſeem coarſer; and ſome, by ſhrinking them, ſmaller; and ſome, by ſmoothing them, finer.

12. Many of the ſame colours are dyed upon ſeveral ſtuffs with ſeveral materials, as red-wood is uſed in cloth, not in ſilks; arnotto in ſilks, not in cloth, and may be dyed at ſeveral prices.

13. The ſcouring and waſhing of ſtuffs to be dyed, is done with ſpecial materials, as ſometimes with ox-galls, ſometimes with fuller's-earth, and ſometimes ſoap; this latter being, in ſome caſes, pernicious, where pot-aſhes will ſtain, or alter the colour.

14. Where great quantities of ſtuffs are to be dyed together, or where they are to be done with any ſpeed, and where the pieces are very long, broad, thick, or otherwiſe, they are to be differently handled, both in reſpect to the veſſels and ingredients.

15. In ſome colours and ſtuffs the tingent liquor muſt be boiling, in other caſes, blood-warm, and in ſome it may be cold.

16. Some tingent liquors are fitted for uſe by long keeping, and in ſome the virtues wear away by the keeping.

17. Some colours or ſtuffs are beſt dyed by reiterated dippings in the ſame liquor, ſome by continuing longer, and others a leſſer time therein.

18. In ſome caſes, the matter of the veſſel wherein the liquors are heated, and the tincture prepared, muſt be regarded, as the kettles muſt be pewter for Bow-dye.

19. There is little reckoning made how much liquor is uſed in proportion to the dying drugs, it being rather adjuſted to the bulk of the ſtuffs, as the veſſels are to their breadth; the quantity of dyeing drugs being proportioned both to the colour, higher or lower, and to the ſtuffs; as likewiſe the ſalts are to the dying drugs.

Concerning the weight that colours give to ſilk, (in which it is moſt taken notice of, being ſold by weight, and a commodity of great price) it is obſerved that one pound of raw ſilk loſeth four ounces by waſhing out the gums, and the natural ſordes: That the ſame ſcoured ſilk may be raiſed to above thirty ounces from the remaining twelve, if it be dyed black with ſome materials. Of a thing very uſeful in dyeing, eſpecially of black, nothing increaſes weight ſo much as galls, by which black ſilks are reſtored to as much weight as they loſt by waſhing out their gum: nor is it counted extraordinary that blacks ſhould gain about four or ſix ounces in the dyeing, upon each pound. Next to galls, old fuſtic increaſes the weight about 1½ in 12; madder, about one ounce; weld, half an ounce. The blue vats in deep blues of the fifth ſtall, give no conſiderable weight; neither doth logwood, cochineal, nor even copperas, where galls are not: ſlippe adds much to the weight, and giveth a deeper black than copperas itſelf, which is a good excuſe for the dyers that uſe it.

Dyeing *of wool and woollen manufactures.* For black in woollen manufactures, it is begun with a ſtrong decoction of woad and indigo, that communicate a deep blue; after which the ſtuffs being boiled with alum and tartar, or pot-aſh, are to be maddered with common madder, then dyed black with Aleppo-galls, copperas, and ſumac, and finiſhed by black-boiling in weld. Wools for tapeſtry are only to be woaded, and then put in black. For ſcarlet, wool and woollen manufactures are dyed with kermes and cochineal, with which may alſo be uſed agaric and arſenic. Crimſon-ſcarlet is dyed with cochineal, maſtic, aquafortis, ſal armoniac, ſublimate, and ſpirit of wine. Violet-ſcarlet, purple, amaranth, and panſy-ſcarlets, are given with woad, cochineal, indigo, braziletto, brazil, and orchal. Common reds are given with pure madder, without any other ingredient. Crimſon-reds, carnations, flame and peach-colours, are given, according to their ſeveral hues, with cochineal, maſtic, without madder, or the like. Crimſon-red is prepared with roman alum with cochineal. Orange-aurora, brick-colour, and onion-peel colour, are dyed with woad and madder, mixed according to their ſeveral ſhades. For blues, the dark are dyed with a ſtrong tincture of woad; the brighter with the ſame liquor, as it weakens in working. Dark browns, minims, and tan-colours, are given with woad, weaker in decoction than for black, with alum and pot-aſhes, after which they are maddered higher than black: for tan-colours, a little cochineal is added. Pearl-colours are given with galls and copperas; ſome are begun with walnut-tree roots, and finiſhed with the former; though to make them more uſeful, they generally dip them in a weak tincture of cochineal. Greens are begun with woad, and finiſhed with weld. Pale yellows, lemon-colour, and ſulphur-colour, are given with weld alone. Olive colours of all degrees are firſt put in green, and taken down with ſoot, more or leſs, according to the ſhade that is required. Feulemort, hair-colour, muſk, and cinnamon-colour, are dyed with weld and madder. Nacaret, or bright orange, is given with weld and goats hair boiled with pot-aſhes.

DYEING *of ſilks*, is begun by boiling them in ſoap, &c. then ſcouring and waſhing them in water, and ſteeping them in cold alum-water. For crimſon, they are ſcoured a ſecond time, before they are put into the cochineal-vat. Red crimſon is dyed with pure cochineal maſtique. Adding galls, turmeric, arſenic, and tartar, all put together in a copper of fair water, almoſt boiling: with theſe the ſilk is to be boiled an hour and a half, after which it is allowed to ſtand in the liquor till next day. Violet-crimſon is given with pure cochineal, arſenic, tartar, and galls; but the galls in leſs proportion than in the former: when taken out, it is waſhed and put in a vat of indigo. Cinnamon-crimſon is begun like the violet, but finiſhed by back-boiling, if too bright, with copperas, and if dark, with a dip of indigo. Light blues are given in a back of indigo. Sky-blues are begun with orchal, and finiſhed with indigo. For citron-colours, the ſilk is firſt alumed, then welded with indigo. Pale yellows, after aluming, are dyed in weld alone. Pale and brown aurora's, after aluming, are welded ſtrongly, then taken down with rocou and diſſolved with pot-aſhes. Flame-colour is begun with rocou, then alumed, and afterwards dipped in a vat or two of brazil. Carnation and roſe colours are firſt alumed, then dipt in brazil. Cinnamon-colour, after aluming, is dipt in brazil, and braziletto. Lead-colour is given with fuſtic, or with weld braziletto, galls and copperas. Black ſilks of the coarſer ſort, are begun by ſcouring them with ſoap, as for other colours; after which they are waſhed out, wrung, and boiled an hour in old galls, where they are ſuffered to ſtand a day or two: then they are waſhed again with fair water, wrung, and put into another vat of new galls; afterwards waſhed again, and wrung, and finiſhed in a vat of black. Fine black ſilks are only put once into galls of the new and fine ſort, that has only boiled an hour: then the ſilks are waſhed, wrung out, and dipped thrice in black, and afterwards taken down by back-boiling with ſoap.

The dyeing of thread is begun by ſcouring it in a lye of good aſhes: afterwards it is wrung, rinſed out in river-water, and wrung again. A bright blue is given with braziletto and indigo: bright green is firſt dyed blue, then back-boiled with braziletto and verdeter, and laſtly woaded. A dark green is given like the former, only darkening more before woading. Lemon and pale yellow is given with weld mixed with rocou. Orange iſabella, with fuſtic, weld, and rocou. Red, both bright and dark, with flame-colour, &c. are given with brazil, either alone, or with a mixture of rocou. Violet, dry roſe, and amaranth, are given with brazil, taken down with indigo. Feulemort and olive colour are given with galls and copperas, taken down with weld, rocou, or fuſtic. Black is given with galls and copperas, taken down and finiſhed with braziletto-wood.

DYKE, or DIKE. See the article DIKE.

DYNAMICS ſignify properly the ſcience of moving forces; but mathematicians, by this term, underſtand the ſcience of the motion of ſuch bodies as impel one another. See the article MOTION.

To dynamics may be referred the theory of the centers of rotation and oſcillation, the laws of the motions of bodies; but particularly of the communication of motion. See CENTER, COMMUNICATION *of Motion*, and PERCUSSION.

This ſcience is that part of mechanics which treats of the generation, or augmentation of powers, and is oppoſed to ſtatics, which is the doctrine of the equilibrium of powers. See the articles MECHANICS and STATICS.

M. D'Alembert has publiſhed a treatiſe of dynamics.

DYNASTY, among antient hiſtorians, ſignifies a race or ſucceſſion of kings of the ſame line or family: ſuch were the dynaſties of Egypt.

The Egyptians reckon thirty dynaſties within the ſpace of 36525 years; but the generality of chronologers look upon them as fabulous. And it is very certain, that theſe dynaſties are not continually ſucceſſive, but collateral.

DYSCRASY, among phyſicians, denotes an ill habit or ſtate of the humours, as in the ſcurvy, jaundice, &c.

DYSENTERY, δυσεντερια, in medicine, a diarrhœa or flux, wherein the ſtools are mixed with blood, and the bowels miſerably tormented with gripes.

Dyſenteries are diſtinguiſhed into benign and malignant. The former continues longer, but proceeds more gently, and is leſs dangerous. The latter is not only of a contagious nature, but is alſo attended with ſome fatal ſymptoms, ſuch as a malignant fever, a defect of ſtrength, and exanthematous diſorders. It may likewiſe be obſerved, that dyſenteries are diſtinguiſhed into red and white: in the former, the humours evacuated are always bloody; but in the latter, ſanious, and mixed with carnous filaments and ulcerous ſhreds abraded from the coats of the inteſtines. The immediate cauſe of a dyſentery, according to the moſt received opinion, is ſeated in the inteſtines, and is a highly acrid humour, generated by ſummer fruits when unripe, fermenting with other juices, eſpecially thoſe of the bilious kind, and vellicating, corroding, and excoriating the nervous coats of the inteſtines. Others think it occaſioned by a certain ſpecific kind of miaſma, whoſe particular quality it is to ferment in the inteſtines, with the bile eſpecially, and then to corrode them. And others think that the genuine and moſt immediate cauſe which produces the ſevere gripes, and all the other train of ſymptoms in a dyſentery, is principally lodged in the blood-veſſels which ſurround the nervous coat of the inteſtines.

As to the prognoſtics, dyſenteries are dangerous to pregnant women, to old men and boys, to the ſcorbutic, the conſumptive, and the cachectic. When they begin with vomiting, ſucceeded with a hiccup, there is danger of an inflammation of the ſtomach. When clyſters are immediately returned, or the anus ſo obſtinately cloſed that nothing can be injected, it is a ſign of a palſy in the rectum. And when ſwallowing is attended with a murmuring noiſe, it ſhews the approach of a delirium, an inflammation of the fauces, aphthæ, or a palſy of the whole œſophagus. The common method of curing a dyſentery, is firſt to bleed, then to vomit with ipecacuanha, afterwards to purge with rhubarb, and, laſt of all, to give aſtringents. When the bowels are ulcerated, it will be of ſervice to inject clyſters, either of fat broth with the addition of venice-treacle, or the electuary of ſcordium, or Locatellus's balſam. Sydenham, after bleeding, preſcribes a paregoric at night, and the next morning a cathartic. Mr. Ray, from the information of Aubrey, ſays, that the fungous ſubſtance between the lobes of a walnut dried and powdered, and given in a moderate quantity of wine, cured the engliſh army of a dyſentery, when all other remedies failed. Juſſieu ſays, a thick yellow bark, called ſimaruba, has been found ſucceſsful in the cure of a dyſentery; and Kramer aſſures us, we may depend on the ſame effect from the decoction of common millet-ſeed. Another ſpecific is the vitrum antimonii ceratum, which has been in uſe for ſome time, but was kept a ſecret till it was communicated to the public by Dr. Young, of Edinburgh. The ordinary doſe for an adult is ten or twelve grains; and it has been found ſucceſsful where bleeding and vomits have been premiſed; and where they have not, it is beſt, ſays Dr. Pringle, to with-hold opium till the patient is both vomited and purged, and then it becomes neceſſary, to begin with ſmall doſes. As to the diet, the ſame author confines the ſick, in the beginning, to rice-gruel, panado, *&c.* and for drink, to rice or barley-water, or the white decoction. In the convaleſcent ſtate they are allowed meat, but no ſmall-beer, and never any milk, unleſs diluted with lime-water, it being obſerved, that milk by itſelf was apt to renew the gripes.

DYSERT, a parliament-town of Scotland, in the county of Fife, ſituated on the northern ſhore of the frith of Forth, about eleven miles north of Edinburgh: weſt longitude 3°, north latitude 56° 10′.

DYSOREXY, among phyſicians, denotes a want of appetite, proceeding from a weakly ſtomach. See APPETITE.

DYSPEPSY, a difficulty of digeſtion, for which phyſicians preſcribe bitters.

DYSPNOEA, a difficulty of breathing, uſually called aſthma. See ASTHMA.

DYSURY, δυσουρια, in medicine, a difficulty of making urine, attended with a ſenſation of heat and pain. It is diſtinguiſhed from a ſtrangury, as, in the laſt, the urine is voided by only a drop, as it were, at a time, but, however, with pain; and from an iſchury, as, in this diſorder, there is an almoſt total ſuppreſſion of urine. A dyſury conſtantly attends a virulent gonorrhœa, accompanies many other diſtempers as a ſymptom, and is frequently excited by very acrimonious medicines, and the external application of cantharides. In a dyſury, emollient and mucilaginous medicines, as gum-arabic diſſolved in barley-water, emulſions and decoctions, with an addition of nitre, copious draughts of diluting fluids and camphor, are uſually preſcribed. See STRANGURY and ISCHURY.

DYTISCUS, WATER-BEETLE, in zoology, a genus of inſects of the order of the coleoptera, the antennæ of which are ſlender and ſetaceous, and their feet formed for ſwimming. See COLEOPTERA.

Authors enumerate a great many ſpecies of this animal, among which is the great water-beetle, the largeſt of all european beetles, being an inch and an half in length, and all over of a deep and ſomewhat gloſſy black. See plate LXXX. fig. 3. n° 1. N° 2, and n° 3. *(ibid.)* repreſent two other ſpecies of this genus.

E.

E, the fifth letter of the alphabet, and ſecond vowel, has different pronunciations in moſt languages. The greeks have their eta η, and epſilon ε, or long and ſhort *e*. The French have their *e* open, pronounced much like our *a* in the words *face* and *make*; their *e* maſculine, pronounced not unlike our *y* at the end of words, as *liberté*, *liberty*; their *e* feminine, or mute, very weakly if at all pronounced, added generally at the end of words, either to diſtinguiſh the feminine gender, or lengthen the ſyllable; and their *e* before an *m* or *n*, which ſounds like our *a* in the word *war*: theſe are all exemplified in the words *empechée* or *enfermée*. In engliſh there are three kinds of *e*, *viz*. the open or long *e*, as in the words *bear*, *wear*; the cloſe or ſhort *e*, as in *wet*, *kept*; and mute *e*, which ſerves to lengthen the ſyllable, as in *love*, *came*, &c.

As a numeral, E ſtands for 250. In muſic, it denotes the tone *e-la-mi*. In the calendar it is the fifth of the dominical letters. And in ſea-charts it diſtinguiſhes all the eaſterly points: thus, E. alone denotes eaſt, E. by S. and E. by N. eaſt by ſouth and eaſt by north. See the article CHARACTER.

EADISH, or EDDISH, among farmers. See the article EDDISH.

EAGLE, *aquila*, in ornithology, the engliſh name of ſeveral ſpecies of falco. See the article FALCO.

The iron-coloured eagle with a yellow cera, called by authors chryſaëtos, or golden eagle, is a large and terrible bird of prey, about the ſize of a turkey, frequent in many parts of Europe; the tongue of which is in ſhape like that of the human ſpecies. The brown or cheſnut-coloured eagle, with a blue cera, is likewiſe a very bold and fierce bird.

The chryſaëtos, or common eagle, is very rapacious; it will ſeize on lambs, and, during the time of its having young, ſcarce any thing is ſafe from it. See plate LXXXI. fig. 1.

The white-tailed eagle, brought from Hudſon's bay, differs from the common kind in the colour of its tail, which is white, only that the tips of the feathers are black, or dark brown; the breaſt too is ſpotted with triangular ſpots. See plate LXXXI. fig. 2.

To theſe may be added the pygargus and haliætus. See the articles PYGARGUS and HALIÆTUS.

In heraldry, the eagle is accounted one of the moſt noble bearings in armoury, and, according to the learned in this ſcience, ought to be given to none but ſuch as greatly excel in the virtues of generoſity and courage, or for having done ſingular ſervices to their ſovereigns; in which caſes they may be allowed a whole eagle, or an eagle naiſſant, or only the head or other parts thereof, as may be moſt agreeable to their exploits.

The reaſon why eagles are generally borne with their wings and tail expanded, is becauſe this poſture is beſt fitted to fill up the eſcutcheon. However, there are eagles borne in other poſtures, though not ſo common; all which will be explained under their reſpective articles.

The arms of the emperor of Germany

are, Or, a ſpread eagle with two heads, ſable; diademed, langued, beaked, and membered, gules. Some authors expreſs the two heads by the term diſplayed. The kingdom of Poland bears, Gules, an eagle, argent; crowned and membered, or.

Among the antients, the eagle was held ſacred to Jupiter, and on that account placed on his ſcepter. Philoſtratus, in his Themiſtocles, ſays, the Medes and Lacedæmonians took it for their enſign of royalty: and it is well known that the Romans had the greateſt reſpect for it, looking upon it as the taliſman of their ſtate, and taking it for their principal enſign. It was either of gold or ſilver, borne ſingle on the point of a pike, till the time of Conſtantine, when the empire being divided into the eaſtern and weſtern, the eagle was afterwards repreſented with two heads.

EAGLE, *aquila*, in aſtronomy. See the article AQUILA.

EAGLE, in architecture, a figure of that bird antiently uſed as an attribute of Jupiter, in the capitals and friezes of the columns of the temples conſecrated to that god.

EAGLE-OWL, the ſame with the bubo, or great-horned owl. See BUBO.

EAGLE-STONE, ÆTITÆ, in natural hiſtory. See the article ÆTITÆ.

Black EAGLE, an order of knighthood, inſtituted by the elector of Brandenburgh, in 1701, on his being crowned king of Pruſſia.

The knights of this order wear an orange-coloured ribband, ſuſpending a black eagle.

White EAGLE, a like order in Poland, inſtituted in 1325, by Uladiſlaus V. On occaſion of the marriage of his ſon Caſimir to the daughter of the great duke of Lithuania.

The knights of this order wear a chain of gold, ſuſpending a ſilver eagle, crowned.

EAGLET, a diminutive of eagle, properly ſignifying a young eagle. In heraldry, when there are ſeveral eagles on the ſame eſcutcheon, they are termed eaglets.

EAR, *auris*, in anatomy, the organ of hearing. See the article HEARING.

Anatomiſts divide the ear into three parts, the exterior, the middle, and the interior. The exterior part is called ſimply the auricle, but more properly auris externa. In this there are a great many eminences and cavities; as, the pinna and lobucle; the helix and anthelix; and the tragus and antitragus; the ſcapha, which is a cavity between the helix and the anthelix behind; and the concha, which is a larger cavity, ſituated before the meatus auditorius, or paſſage into the internal ear: here are to be obſerved the glandulæ ſebaceæ of Valſalva, which are mere cutaneous follicles: their ſubſtance is compoſed of the common integuments and a cartilage.

The muſcles of the external ear are in human ſubjects very ſmall, often ſcarce diſcernible; however, ſometimes two, three, or more of them may be diſtinguiſhed. Theſe, from their ſituation, may be called the ſuperior, the poſterior, and the anterior. Their uſe in moving the ear is none at all, or very inconſiderable; their real uſe, as is ſuppoſed, is to render the ear tenſe, when we would hear more diſtinctly. The courſe of the meatus auditorius is tortuous and oblique, turning chiefly towards the anterior parts. Its ſubſtance is partly boney, and partly cartilaginous: is is covered with an elaſtic membrane: the membrane inveſting its internal part is continuous with the cutis. In the convex part of this membrane, about the middle of the paſſage, are ſituated certain ſmall glands, of a yellow colour, called glandulæ ceruminoſæ: they ſerve to ſecrete the cerumen, which they depoſit for various purpoſes in the paſſage.

The uſe of the external ear is to receive and convey ſounds in the manner of an acouſtic tube, in order to our hearing them more diſtinctly.

The middle part of the ear is called the tympanum: in this we are to obſerve the membrana tympani, which is ſituated at the extremity of the auditory paſſage. Its ſituation is very oblique inwards; its figure elliptic, and its ſurface concave. It is connected in its circumference with a ring of a boney ſubſtance in infants, which becomes afterwards transformed into the auditory paſſage, and in the middle it is connected with the little bone, called the malleus. Its ſubſtance is membranaceous, compoſed of two or three lamellæ, and is furniſhed with a vaſt number of blood-veſſels.

Some authors mention a natural foramen, very ſmall, and placed in an oblique direction, penetrating this membrane, and letting the ſmoke of tobacco, taken in at the mouth, find a paſſage through it out at the ears. The boney cavity of the tympanum is much ſmaller in human ſubjects than in quadrupeds. In this cavity are to be obſerved the perioſteum, which is very thin, and furniſhed with a great number of blood-veſſels; the chorda tympani, being a little nerve compoſed by a combination of ramuli, or little branches of the fifth and ſeventh pairs: this is extended in the manner of a cord, under the membrane of the tympanum. Here may be obſerved the three oſſicula auditus, covered with the perioſteum; theſe are called the malleus, the incus, and the ſtapes. The manubrium, or handle of the malleus, adheres to the membrane of the tympanum, and its head is articulated by a ginglymus with the body of the incus; and, finally, the longer leg of this is articulated, by arthrodia, with the head of the ſtapes: the ſtapes alſo, at its baſe, adheres to the feneſtra ovalis, by means of a membrane.

The muſcles of the malleus are two, an external and internal: the ſtapes has but one. The two feneſtræ, or openings, are diſtinguiſhed by the oval and the round; the feneſtra ovalis leads to the veſtibule, on which ſtands the ſtapes; the feneſtra rotunda leads to the cochlea, and is cloſed by a membrane.

Beſides the feneſtræ, there are two other foramina, the one of theſe opens into the tube or duct of Euſtachius, and terminates in the mouth, almoſt immediately behind the tonſils: this duct is partly boney, partly cartilaginous, and partly membranous, affording a communication between the mouth and the ears: the other of theſe foramina goes to the cellulæ of the maſtoide proceſſes. The third diviſion, or the inner part of the ear, is generally termed the labyrinth: here are to be obſerved the veſtibulum, being a cavity that forms the middle part of the labyrinth: the paſſage into this is the feneſtra ovalis; after which may be obſerved the three ſemicircular canals, diſtinguiſhed by the names of the largeſt, the middle one, and the leaſt, which open by five orifices into the veſtibulum. The cochlea of the ear is placed oppoſite to theſe canals, and is in the manner of a ſnail-ſhell, forming two turns and a half in a ſpiral form. In this are to be remarked the nucleus and the canal, which is divided into two, by a ſpiral lamina: the upper of theſe opens into the veſtibulum, and is called the ſcala veſtibuli, and the lower, which terminates in the hollow of the tympanum, through the feneſtra rotunda, is called ſcala tympani.

A very delicate and fine membrane carried along through the cavities of the labyrinth, is formed of an expanſion of the auditory nerve, and is the primary part of the organ of hearing, juſt as the retina is formed of the expanſion of the optic nerve, and is the primary organ of ſeeing. Next may be obſerved the auditory canal, which is diſtinguiſhed into the common and proper; the common is large, and has foraminula in it, paſſing into the labyrinth; the proper one is narrow and longer, terminating partly in the cavity of the cranium, and partly between the ſtyloide and maſtoide proceſſes.

The nerves of the inner ear are, 1. from the auditory pair. 2. from the third pair of the vertebrals of the neck, but theſe are principally ſent to the external ear. The arteries are from the carotids, both external and internal; the veins run partly to the juglars, and partly to the ſinuſes of the dura mater.

Wounds of the EAR. Wounds of the external ear are eaſily united by ſticking-plaiſters, unleſs the cartilage is entirely divided, and then it will require the help of the needle, and the application of vulnerary balſams, with the proper compreſſes and bandages. When the ear is wounded in the neighbourhood of the meatus auditorius, great care muſt be taken to prevent the diſcharge of blood and matter into that paſſage, which would do great miſchief to the tympanum; but this may be done only by filling the internal ear with lint or cotton.

EAR-ACH, a grievous pain in the auditory paſſage, proceeding from a ſharp extravaſated ſerum, affecting the nervous membrane which covers the meatus auditorius.

When this matter is tranſlated to the external part, then the ear-ach ariſes, which, unleſs ſpeedily appeaſed, may coſt the patient his life.

The principal ſcope is to eaſe the pain, which may be done with nitrous and cinnabarine powders, and with emulſions of the greater cold ſeeds: but if theſe are ineffectual, recourſe muſt be had to opiates, ſuch as ſtyrax pills, or the bare tincture. Outwardly lay a plaſter to the temple of the affected ſide, compoſed of maſtic, galbanum, ſaffron, expreſſed oil of nutmegs, and opium. Afterwards let the ear be held over the vapour of milk, with the fragrant and emollient ſpices: the ſmoke of tobacco, blown into the ear, is of great efficacy; as alſo an infuſion of millepedes in ſallad oil.

Cloſed meatus auditorius. Sometimes the meatus auditorius is from the birth cloſed with a membrane, differing in degrees of thickneſs; ſometimes immediately after the birth, and ſometimes a conſiderable while after. When this membrane cloſes the external ear, the faculty of hearing may be reſtored by making a cruciform inciſion in the occluding membrane, and keeping the paſſage open for ſome time with lint, or a tent; but when the ſaid membrane is ſeated very deep, it is beſt to divide it by a tranſverſe or longitudital inciſion, taking care that you do not at the ſame time wound the membrane of the tympanum which in infants is not ſeated ſo deep in the ear as in adults.

Tubercles in the meatus auditorius. Tubercles or fleſhy excreſcences in the auditory paſſage of the ears give great uneaſineſs, and do partly, if not wholly, obſtruct the hearing. When they are not of long ſtanding, they may be removed with eſcharotics; or, as theſe are dangerous when they touch the membrane of the tympanum, they may be extirpated by the ſciſſars, or ſcalpel, when they are not ſeated too low in the ear. Laſtly, it appears from the obſervations of Hildanus, (cent. iii. obſ. 1.) and Purmannus, (chirurg. pag. 280.) that theſe tubercles may be frequently removed with ſucceſs by ligature.

For other diſorders of the ear, and for the method of extracting extraneous bodies fallen into it, ſee the articles DEAFNESS, TINNITUS AURIUM, &c. and the article EXTRACTION.

EAR, in muſic, denotes a kind of internal ſenſe, by which we perceive and judge of harmony, and muſical ſounds.

EAR, among gardeners, a name given to the leaves that firſt appear from the ſeed, which differ conſiderably from other leaves. See the article LEAF.

EAR-PICK, an inſtrument of ivory, ſilver, or other metal, ſomewhat in form of a probe, for cleaning the ear.

The Chineſe have a variety of theſe inſtruments, with which they are mighty fond of tickling their ears; but this practice, as Sir Hans Sloane judiciouſly obſerves, muſt be very prejudicial to ſo delicate an organ, by bringing too great a flow of humours on it.

EAR-SHELLS, *aures marinæ.* See the article AURES MARINÆ.

Small pearls are ſometimes found in theſe ſhells, whereof there are ſeveral ſpecies. See the article PEARL.

EAR-WAX, *cerumen.* See the article CERUMEN.

EAR-WIG, *forficula,* in zoology. See the article FORFICULA.

EARING, in the ſea-language, is that part of the bolt rope which at the four corners of the ſail is left open, in the ſhape of a ring. The two uppermoſt parts are put over the ends of the yard arms, and ſo the ſail is made faſt to the yard; and into the lowermoſt earings, the ſheets and tacks are ſeized or bent at the clew.

EARL, a britiſh title of nobility, next below a marquis, and above a viſcount. Earls were antiently called comites, becauſe they were wont *comitari regem,* to wait upon the king for council and advice. The Germans call them *graves,* as landgrave, margrave, palſgrave, rheingrave; the Saxons ealdormen, unleſs that title might be more properly applied to our dukes; the Danes, eorlas; and the Engliſh, earls. The title, originally, died with the man. William the conqueror firſt made it hereditary, giving it in fee to his nobles, and alloting them for the ſupport of their ſtate the third penny out of the ſheriff's court, iſſuing out of all pleas of the ſhire whence they had their title. But now the matter is quite otherwiſe; for whereas heretofore *comes* and *comitatus* were correlatives, and there was no comes or earl, but had a county or ſhire for his earldom, of latter years the number of earls increaſing, and no more counties being left, divers have made choice of ſome eminent part of a county, as Lindſey, Holland, Cleveland, &c. ſome of a leſſer part, as Strafford, &c. others have choſen for their title ſome eminent town, as Marlborough, Exeter, Briſtol, &c. and ſome have taken for their title the name of a ſmall village: their own ſeat or park, as Godolphin, Clarendon, &c. An earl is created by cincture of ſword, mantle of ſtate put upon him by the king himſelf, a cap and a coronet put upon his head, and a charter in his hand. All the earls of England are denominated from ſome ſhire, town or place, except three; two of whom, *viz.* earl Rivers, and earl Paulet, take their denomination from illuſtrious families: the third is not only honorary, as all the reſt, but alſo officiary,

ciary, as the earl marſhal of England.

EARL *marſhal of England*, is a great officer who had antiently ſeveral courts under his juriſdiction, as the court of chivalry, and the court of honour. Under him is alſo the herald's office or college of arms. He hath ſome pre-eminence in the court of Marſhalſea, where he may ſit in judgment againſt thoſe who offend within the verge of the king's court. This office is of great antiquity in England, and antiently of greater power than now; and has been for ſeveral ages hereditary in the moſt noble family of Howard.

EARNEST, *arrhæ*, money advanced to bind the parties to the performance of a verbal bargain. By the civil law, he who recedes from his bargain loſes his earneſt, and if the perſon who received the earneſt give back, he is to return the earneſt double. But with us, the perſon who gave it, is in ſtrictneſs obliged to abide by his bargain; and in caſe he decline it, is not diſcharged upon forfeiting his earneſt, but may be ſued for the whole money ſtipulated.

EARTH, *terra*, in phyſiology, one of the four vulgar, or peripatetical elements: defined a ſimple, dry, and cold ſubſtance; and as ſuch, an ingredient in the compoſition of all natural bodies.

It ſhould be well obſerved, that the element earth is a very different matter from the earth whereon we tread. Ariſtotle having laid down cold and dry as his firſt element, to give it a ſuitable name, looked among the diverſe bodies for that which ſhould come the neareſt thereto; which being earth, he gave his firſt element that denomination: though thus borrowing a word that had had been uſed for a different thing, occaſioned a great part of his followers to run into an extravagant error, and to ſuppoſe that this habitable foſſile earth was an element.

EARTH, in natural hiſtory, a foſſile, or terreſtrial matter, whereof our globe partly conſiſts.

Earths are either ſimple or compound. The ſimple earths are friable, opake, inſipid bodies, not inflammable, vitrifiable by extreme heat, diffuſible in water, and ſeparable from it by filtration. Of theſe we have five genera or kinds, *viz.* boles, clays, marles, ochres, and tripelas. See BOLE, CLAY, MARLE, &c.

The compound earths are compoſed of argillaceous or marley particles ſeparated and divided by adventitious matter, and never free from theſe mixtures, or in the ſtate of pure earths. Of theſe we have four genera, two of loams, *viz.* thrauſtomicthes, and gliſchromicthes; and two of moulds, *viz.* thruptomicthes, and gloromicthes. See LOAMS, MOULD, THRAUSTOMICTHES, THRUPTOMICTHES, &c.

Beſides theſe earths, there are frequently found in digging a kind of terræ miſcellanæ, of no determinate ſpecies, nor to be known by any peculiar name, being compoſed of maſſes of different ſizes, of different ſpecies of earths, broken off from their ſtrata, ſoon after their formation, and blended together at the time of the original ſubſidence of the ſtrata. As for chian, eretrian, lemnian, and malteſe earths, together with all the ſealed earths which are the ſubjects of the materia medica, ſee the articles CHIAN EARTH, ERETRIAN EARTH, BOLE, MARLE, &c.

EARTH, in gardening and huſbandry, if good, ſhould be of a blackiſh colour, gravelly, fat, pliant, or eaſy to be digged; it ſhould be neither cold nor light, it ought to have no ill ſmell or taſte, and it ſhould be of the ſame quality three or four feet deep for trees, which if they have not that depth, will languiſh and decay after they have been planted ſix years. Fruit trees will thrive in a leſs depth, and they generally produce the moſt generous fruits, when their roots ſpread near the ſurface of the earth.

Huſbandmen call that new earth which lying three or more feet deep, never ſerved to the nouriſhment of any plant; or earth that has been a long time built upon, though it had formerly bore; earth likewiſe of a ſandy loamy nature, where cattle have been a long time fed, may be accounted ſuch, and be of excellent uſe for moſt ſorts of plants, eſpecially if it has been thrown up in heaps to grow richer.

EARTH, in chemiſtry, is uſed for a principle or element, in the compoſition of bodies, entering them either as an ingredient, or giving them a power of performing various operations in nature and art. It is a body, as having three dimenſions, impenetrability, figurability, and its own particular gravity. In weight it exceeds water, ſalts, and the ſpirits of animals and vegetables. When pure, or perfectly ſeparated from other bodies, it is conſiſtent, hard, and fine, though brittle with regard to our ſenſes, and eaſily reducible by trituration into a certain powder, in which reſpect it differs from the true metals and gems; though ſtill more in this, that it remains fixed and unchanged in the moſt violent fire, even ſo far as not to flow therein.

Boerhaave ſays, he never could obtain elementary earth from metals, but it may be obtained from water, from calcined vegetables, from ſmoak and ſoot, from putrified animals, from diſtilled animal fluids, from foſſile ſalts, and from fluid and ſolid ſulphurs. Whence he concludes, that the ſame ſimple elementary earth contributes as a conſtituent principle to form the particular corporeal fabric of animals, vegetables, and ſome foſſils of a leſs permanent and leſs ſimple nature, and in them all ſerves as a firm baſis to their form, whilſt it unites the other principles to itſelf, and to one another, ſo as to conſtitute one determinate individual. Hence alſo, ſays he, the property of aſſimulating other ſubſtances into the nature of every body that receives nutriment, and conſequently the ſeminal property of producing their like, is principally owing to the efficacy of this earth; for their properties no longer remain after the particular texture depending principally upon the earth is deſtroyed, or wanting in any body.

EARTH, in aſtronomy and geography, one of the primary planets, being this terraqueous globe whereon we inhabit.

Figure of the EARTH was accounted by ſome of the antients to be like that of an oblong cylinder; by others, of the form of a drum, and by others to be flat. The moderns demonſtrate it to be nearly ſpherical from the following, among other conſiderations. 1. All the appearances of the heavens, both at land and at ſea, are the ſame as they would be if the earth were a globe. 2. In eclipſes of the moon which are cauſed by the ſhadow of the earth falling upon the moon, this ſhadow is always circular, and a body can be no other than a globe, which in all ſituations caſts a circular ſhadow. 3. Several navigators have ſailed quite round the globe, ſteering their courſe directly ſouth and weſt till they came to the magellanic ſea, and from thence to the north and weſt, till they returned to their port from the eaſt; and all the phænomena which ſhould naturally ariſe from the earth's rotundity, happened to them. Beſides, their method of ſailing was alſo founded upon this hypotheſis, which could never have ſucceeded ſo happily, if the earth had been of any other figure. It is true, the ſurface of the earth is not an exact geometrical globe, but then the inequalities are ſo inconſiderable, that the higheſt mountain bears no greater proportion to the bulk of the earth, than a grain of duſt does to a common globe. The figure of the earth then was reckoned by mathematicians and geographers as perfectly ſpherical, excepting the ſmall inequalities in its ſurface, of mountains and vallies, till an accident engaged the attention of Sir Iſaac Newton, and Mr. Huygens, who demonſtrated from the laws of hydroſtatics, and the revolution of the earth about its axis, that its figure was not a true ſphere, but an oblate ſpheroid flatted towards the poles. Monſieur Richer, when at the iſland of Cayenne, about five degrees diſtant from the equator, found that his clock, which at Paris kept true time, now loſt two minutes and twenty-eight ſeconds every day. Now, though heat will lengthen pendulums, and conſequently retard their motion, it is certain the heats of Cayenne were not ſufficient to ſolve this phænomenon, which can flow only from a diminution in the preſſure of gravity. For, as the earth revolves about its axis, all its parts will endeavour to recede from the axis of motion, and thereby the equatoreal parts, where the motion is quickeſt, will tend leſs towards the center than the reſt; their endeavour to fly off from the axis about which they revolve, taking off part of their tendency that way; ſo that thoſe parts will become lighter than ſuch as are nearer the poles. The polar parts, therefore, will preſs in towards the center, and raiſe the equatoreal parts, till the quantity of matter in the latter is ſo far increaſed as to compenſate for its lightneſs, and an equilibrium be reſtored. On which account, the form which the earth aſſumes will be that of an oblate ſpheroid, whoſe ſhorter axis paſſes thro' the poles. By virtue only of the rotation of the earth about its axis, the weight of bodies at the equator is leſs than at the poles, in the proportion of 288 to 289. From hence ariſes, as before obſerved, a ſpheroidical form of the earth, and from that ſpheroidical form ariſes another diminution of gravity at the equator, by which, if the earth were homogeneous throughout, bodies at the equator would loſe one pound in 1121, and ſo on both accounts taken together, the gravity of bodies at the poles would be to the ſame at the equator as 230 to 229. From whence, if we ſuppoſe the gravity of bodies within the earth to be directly as their diſtance from the center, thoſe numbers will alſo expreſs the relation between its polar and equatoreal diameter. This is upon a ſuppoſition that the earth was at firſt fluid, or a chaos, having its ſolid and fluid parts confuſedly mixed together; but if we ſuppoſe it at firſt partly fluid and partly dry, as it now is, ſince we find that the land is very nearly of the ſame figure with the ſea, except raiſed a little to prevent its being overflowed, the earth muſt ſtill be of the ſame form; for otherwiſe the major part of the water would flow towards the equator, and ſpread itſelf like an inundation over all the land in thoſe parts. This theory met with great oppoſition from Monſieur Caſſini, who having meaſured the meridian of France, declared (with great reaſon likewiſe if the obſervations had been correct) that the earth, inſtead of being flattened, was lengthened towards the poles, that is, inſtead of being an oblate, it was an oblong ſpheroid, higher at the poles by about ninety five miles. So wide a difference, between philoſophers of ſo high rank, determined at length the king of France, at an expence becoming a monarch, to employ two companies of mathematicians, the one to meaſure the length of a degree of the meridian at the equator, and the other the length of a degree at the polar circle, that by comparing them together, and with the length of the degree of France, it might be known whether the earth were oblong or flat towards the poles.

It is certain, if the lengths of the degrees of latitude decreaſe, as we go from the equator towards the poles, then the axis is greater, and the figure an oblong ſpheroid; but on the contrary, if theſe lengths increaſe, as you remove towards the poles, the axis is leſs than a diameter at the equator, and conſequently the figure an oblate ſpheroid. This laſt appears, by the reſpective menſurations of theſe mathematicians (as it did before by the theory of Sir Iſaac Newton) to be the true figure; the reſult of their operations, which were performed with a ſurprizing degree of exactneſs, being as follows. The meaſure of a degree of the meridian in the latitude of 66° 20′, was found to be $57437\frac{9}{10}$ toiſes, and in the latitude of 49° 21′ only 57183 toiſes; for the obſervations of Mr. Caſſini have been corrected by ſome gentlemen of the french academy, ſince the return of the academicians from the north. Now ſuppoſing thoſe degrees accurately meaſured, the axis or diameter that paſſes through the poles will be to the diameter of the equator, as 177 to 178, and hence the earth will be twenty-two miles higher at the equator than at the poles. The length of a degree of the meridian under the equator, was found to be 56767 toiſes, and by reducing it to the level of the ſea, 56746 toiſes. But as the heat muſt needs have produced ſome variation in the length of the toiſe that was uſed, when this correction is made, the length of a degree was found to be 56753 toiſes, and the ratio of the axis of the earth to the diameter of the equator, that of 178 to 179; whence it follows that the earth is oblate, or flatted a 179th part towards the poles. Hence the length of the degrees of the meridian in any latitude are determined, for which we refer to the article DEGREE. If any one is deſirous of being informed of the methods obſerved in performing theſe menſurations at the equator, and the arctic circle, let him conſult Mr. Maupertuis's figure of the earth determined, with Mr. Murdoch's tranſlation, and the book lately publiſhed by Mr. Bouguer and Condamine.

From the theory, already given, of the earth, it appears, that, in its ſpheroidical figure, the degrees of latitude increaſe from the equator to the pole; ſo that if, in the equator, a degree conſiſts of ſixty miles, in the ſeveral latitudes the miles will be as below:

Lat.	0.	10°.	20°.	30°.	40.	50°.
M. in a deg.	60.	59,5.	59,57.	59,67.	59,8.	59,93.
Lat.	60°.	70°.	80°.	90°.		
M. in a deg.	60,06.	60,16.	60,235.	60,26.		

Denſity of the EARTH. See *Quantity of matter in the* EARTH, infra.

Geographical diviſions of the EARTH, comprehend, 1. Its natural diviſions, as continent, iſland, peninſula, ocean, lake, gulph, *&c.* 2. Its political diviſions, as empire, kingdom, province, city, Germany, Britain, Middleſex, London, *&c.* 3. The eccleſiaſtical diviſions, as archbiſhopric, dioceſe, pariſh, *&c.* See the articles CONTINENT, ISLAND, *&c.*

Magnetiſm of the EARTH. Dr. Knight thinks the earth may be conſidered as a great loadſtone, whoſe magnetical parts are diſpoſed in a very irregular manner, and that the ſouth pole of the earth is analogous to the north pole in magnets; that is, the pole by which the magnetical ſtream enters. He obſerves, that the earth might become magnetical by the iron-ores it contains, and notwithſtanding it might have remained unmagnetical, unleſs ſome cauſe had exiſted capable of making that repellent matter producing magnetiſm move in a ſtream thro' the earth, yet he thinks that ſuch a cauſe does really exiſt. For if the earth revolves round the ſun in an ellipſis, and the ſouth pole of the earth is directed towards the ſun at the time of its deſcent, a ſtream of repellent matter will thereby be made to enter at the ſouth pole, and come out at the north. And he ſuggeſts, that the earth's being in its perihelion in the winter, may be one reaſon why magnetiſm is ſtronger in this ſeaſon than in ſummer. Hence alſo the doctor thinks it probable, that the earth's magnetiſm has been improving ſince the creation, and that this may be one reaſon why the uſe of the compaſs was not diſcovered ſooner. See the article MAGNET.

Motion of the EARTH. The earth has a triple motion. 1. A *diurnal motion* round its own axis, from weſt to eaſt, in twenty-four hours, which occaſions the perpetual ſucceſſion of days and nights. It is agreeable to reaſon that the earth ſhould revolve about its axis to account for the appearance of ſuch a vaſt number of ſtars which ſeem to perform their revolutions round the earth in twenty-four hours; for the motion of theſe ſtars, were it real, would be incredibly ſwift and beyond all imagination, becauſe their diſtance in reſpect of us, is almoſt infinite, and the orbit they have to run round ſo prodigiouſly great, that they muſt move at leaſt 100,000 miles in a minute. See the articles DIURNAL and COPERNICAN *Syſtem*.

2. An *annual motion* round the ſun in a year, which produces the different ſeaſons, and the lengthening and ſhortening of days. We have, under the article COPERNICAN *Syſtem*, demonſtrated that the earth moves round the ſun: we ſhall here explain the phænomena that ariſe from that motion, in conjunction with the rotation round its axis, having firſt premiſed that the earth in its annual motion has its axis always in the ſame direction, or parallel to itſelf. See the article PARALLELISM.

Suppoſe ♑ ♈ ♋ ♎ (plate LXXXII. fig. 1.) the earth's orbit, and S the ſun. Thro' the center of the ſun draw the right line ♈ S ♎ parallel to the common ſection of the equator and the ecliptic, which will meet with the ecliptic in two points ♈ ♎. And when the earth ſeen from the ſun is in either of the points ♈ or ♎, a right line S ♈ or S ♎, joining the center of the earth and ſun, will coincide with the common ſection of the equator and ecliptic, and will then be perpendicular to A B, the axis of the earth, or of the equator, becauſe it is in the plane of the equator. But the ſame line is alſo perpendicular to the circle which bounds the light and darkneſs, and therefore the axis of the earth will be in the plane of that circle, which will therefore paſs through the poles of the earth, and will cut the equator and all its parallels into equal parts. When the earth, therefore, is in the beginning of ♎, the ſun will be ſeen in ♈, in the common ſection of the equator and ecliptic, in which poſition, the circle of illumination touches both poles; the ſun is vertical to the equator, and the days and nights are equal all the world over: and this will be the ſpring ſeaſon, or vernal equinox. See the article EQUINOX.

The earth in its annual motion going through ♎, ♏, and ♐ towards ♑, and the common ſection of the equator and the ecliptic remaining always parallel to itſelf, it will no longer paſs through the body of the ſun; but, in ♑, it makes a right angle with the line S P, which joins the centers of the ſun and earth. And becauſe the line S P is not in the plane of the equator, but in that of the ecliptic, the angle B P S, which the axis of the earth B A makes with it, will not now be a right angle, but an oblique one of 66 ½ degrees, which is the ſame with the inclination of the axis to the plane of the ecliptic. Let the angle S P L be a right angle, and the circle bounding light and darkneſs, will paſs through the point L, and then the arch BL, or the angle BPL, will be 23 ½ degrees, that is, equal to the compliment of the angle B P S to a right angle. Let the angle B P Æ be a right angle, and then the line P Æ will be in the plane of the equator. Therefore, becauſe the arches B Æ and L T are equal, each of them being quadrants; if

Fig. 1. Annual Motion of the EARTH.

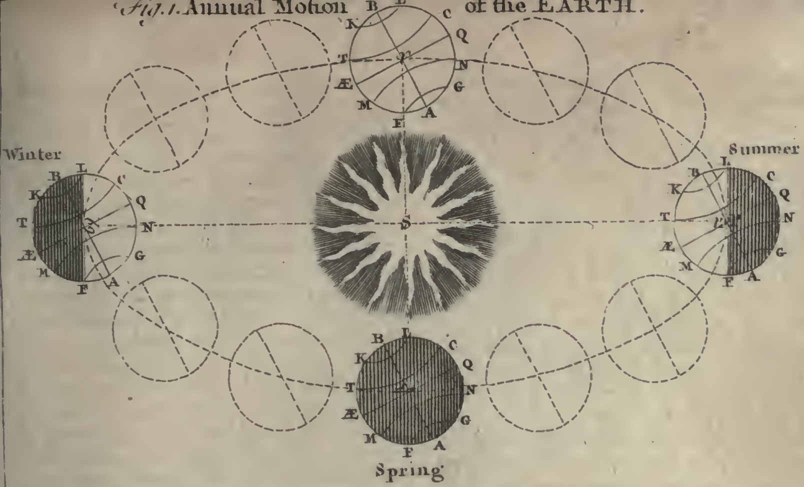


Fig. 2. ECHINOPS, GLOVE-THISTLE.

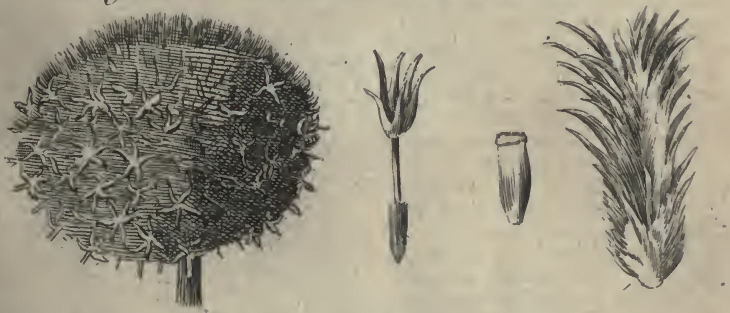


Fig. 3. ECHIUM, VIPER'S BUGLOSS.

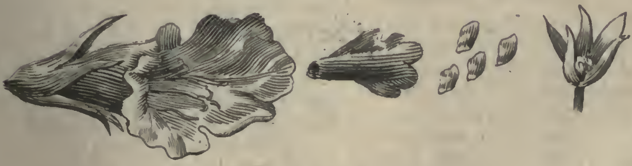
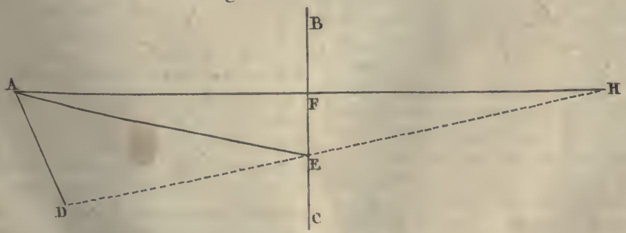


Fig. 4 ECHO.



J. Jefferys sculp

if the common arch B T be taken away, there will remain T Æ equal to L B, equal to 23 ½ degrees. Take Æ M equal to Æ T, and through the points M and T deſcribe two parallel circles T C, M N; the one repreſents the tropic of cancer, and the other the tropic of capricorn. And the earth being in this ſituation, the ſun will approach the neareſt that it can come to the north pole: he will ſhine perpendicularly on the point T, and conſequently will be vertical to all the inhabitants under the tropic of cancer, when he comes to their meridians. It is manifeſt that the circle which bounds light and darkneſs, reaches beyond the north pole B to L; but towards the ſouth it falls ſhort to the ſouth pole A, and reaches no farther than F. Through L and F, let two parallels to the equator be deſcribed. Theſe will repreſent the polar circles, and while the earth is in P, all that tract of it which is included within the polar circle K L continues in the light, notwithſtanding the conſtant revolution round the axis. On the contrary, thoſe that lye within the antarctic circle remain in continual darkneſs. Beſides, it is alſo manifeſt, that all the parallels between the equator and the arctic circle, are cut by the circle bounding light and darkneſs into unequal portions, the largeſt portions of theſe circles remaining in the light, and the ſmalleſt in darkneſs; but theſe parallels which are towards the antarctic circle have their greateſt portions in darkneſs, and their leaſt in light; and the difference of theſe portions will be greater or leſs, according as the circles are nearer to the pole, or to the equator. Therefore, when the ſun is ſeen in cancer ♋, the inhabitants of the northern hemiſphere will have their days at the longeſt, and their nights at the ſhorteſt, and the ſeaſon of the year will be ſummer. The contrary of this will happen to the inhabitants of the ſouthern hemiſphere.

As the earth moves on from ♑ by ♒, ♓, the north pole returns, the diurnal arches begin gradually to decreaſe, and the nocturnal to increaſe, and of conſequence, the ſun's rays will fall more and more obliquely, and his heat proportionably diminiſhes, till the earth comes to ♈, when the ſun will appear in ♎, at which time, the days will again be equal to the nights to all the inhabitants of the earth, the circle bounding light and darkneſs paſſing, in this poſition, through the poles. This will be the ſeaſon called autumn.

The earth moving on through ♈ ♉ and ♊, the ſun will be ſeen to go in the ecliptic through ♎ ♏ and ♐, and will appear to decline from the equator, towards the ſouth, ſo that when the earth is really in ♋, the ſun will appear in ♑. And whereas the axis A B always retains its paralleliſm, the earth will have the ſame poſition and aſpect in reſpect to the ſun, that it had when it was in ♑; but with this difference, that when the tract within the polar circle K L was in continual light while the earth was in ♑; now the earth arriving at ♋, that ſame tract will be altogether in darkneſs: but the oppoſite ſpace within the circle F G, will be in a continual illumination, and at the pole A there will be no night for the ſpace of ſix months. Here likewiſe of the parallels between the equator and the north pole, the illuminated portions are much leſs than the portions which remain in darkneſs, the contrary of which happened in the former poſition, ſo likewiſe the ſun at mid day will appear vertical to all the inhabitants that live in the tropic M N; ſo that it will appear to have deſcended towards the ſouth from the parallel T C, to the parallel M N, through the arch C Q N, which is forty-ſeven degrees. This will be the ſeaſon called winter.

Laſtly, as the earth journeys on from cancer through ♌ and ♍ to ♎, the ſun appears to paſs through ♒ and ♓ to ♈, and the northern climes begin to return, and receive more directly the enlivening beams of the ſun, whoſe meridian height does now each day increaſe; the days now lengthen, and the tedious nights contract their reſpective arches; and every thing conſpires to advance the delighful ſeaſon of the ſpring, with the equality of days and nights, as was ſhewn when the earth was in libra, from which point we began to trace its motion.

By the third motion of the earth, we mean that motion by which the poles of the world revolve about the poles of the ecliptic, and occaſion what is commonly called the preceſſion of the equinoxes, or more properly, the retrogreſſion of the earth's nodes. See the article PRECESSION.

As to the velocity of the earth's motion, and the figure and time in which it performs a revolution round the ſun, ſee the articles PERIOD and ORBIT.

Quantity of matter in the EARTH. This arduous problem can only be ſolved by the principles of gravitation. We know the force of gravity towards our earth by the deſcent of heavy bodies, or by calculating how much the moon falls below the tangent of her orbit: alſo by computing, from their motions, how much a primary planet falls below its tangent in a given time, and how much any of Jupiter's and Saturn's ſatellites fall below their tangents in the ſame time, we are able to determine the proportion which the gravity of a primary planet to the ſun, and of a ſatellite towards its primary, bears to the gravity of the moon towards the earth, in their reſpective diſtances. Then, from the general law of the variation of gravity, the forces that would act upon them at equal diſtances from the ſun, Jupiter, Saturn, and the earth are computed; which give the proportion of the quantities of matter contained in theſe different bodies; that is, if we ſuppoſe the matter of the ſun to be 1, the quantities of matter in Jupiter, Saturn, and the earth will be reſpectively $\frac{1}{1067}$, $\frac{1}{3021}$, $\frac{1}{169282}$.

The quantities of matter in theſe bodies being thus determined, and their bulk being known from aſtronomical obſervations, it is eaſy to compute their different denſities. Thus, the denſities of the ſun, Jupiter, Saturn, and the earth have been computed to be reſpectively as the numbers 100, 94 $\frac{1}{2}$, 67, and 400.

Theory of the EARTH. The earth in its natural and original ſtate Des Cartes, Burnet, Woodward, and Whiſton, ſuppoſe to have been perfectly round, ſmooth, and equable; and they account for its preſent rude and irregular form principally from the great deluge. See the article DELUGE.

Mr. de Buffon, arguing from the ſpheroidical figure of the earth, and the laws of hydroſtatics, ſuppoſes that the earth, as well as the other planets, are parts ſtruck off from the body of the ſun by the colliſion of comets, and conſequently, when the earth aſſumed its form, it was in a ſtate of liquefaction by fire. Of this, ſays he, we will be the more eaſily convinced, when we conſider the nature of the matter contained in the body of the earth, the greateſt part of which, as ſand and clays, are vitrified, or vitrifiable ſubſtances; and, on the other hand, when we reflect upon the impoſſibility of the earth's being ever in a ſtate of fluidity produced by water, ſince there is infinitely more land than water; and beſides, water has not the power of diſſolving ſand, ſtones, and other ſubſtances of which the earth is compoſed. How far the inequalities in the face of the earth, the beds of rivers, lakes, *&c.* and the various ſtrata in its internal parts, ſerve to confirm this hypotheſis, may be ſeen in Hiſtoire Naturelle, *&c.* tom. 1. by M. de Buffon, and in the articles MOUNTAIN, RIVER, STRATA, *&c.*

Diameter of the EARTH. See DIAMETER.

Diſtance of the EARTH *from the Sun.* See the article DISTANCE.

Latitude of the EARTH. See LATITUDE.

Longitude of the EARTH. See LONGITUDE.

EARTH-BAGS, *facs a terre*, in fortification. See the article SAND-BAGS.

EARTHING, in agriculture and gardening, ſignifies the covering of ſhrubs and plants, as vines, celery, *&c.* with earth.

EARTHQUAKE, in natural-hiſtory, a violent agitation or trembling of ſome conſiderable part of the earth, generally attended with a terrible noiſe like thunder, and ſometimes with an eruption of fire, water, wind, *&c.*

Cauſes of EARTHQUAKES. Earthquakes and vulcanos are both produced from the ſame cauſe, which may be thus explained. Thoſe countries which yield great ſtore of ſulphur and nitre, or where ſulphur is ſublimed from the pyrites, are by far the moſt injured and incommoded by earthquakes; for where there are ſuch mines, they muſt ſend up exhalations, which meeting with ſubterraneous caverns, muſt ſtick to the arches of them, as ſoot does to the ſides of our chimnies; where they mix themſelves with the nitre or ſaltpetre which comes out of theſe arches, in like manner as we ſee it come out of the inſide of the arch of a bridge and ſo makes a kind of cruſt which will very eaſily take fire.

There are ſeveral ways by which this cruſt may take fire, *viz.* 1. By the inflammable breath of the pyrites, which is a kind of ſulphur that naturally takes fire of itſelf. 2. By a fermentation of vapours to a degree of heat, equal to that of fire and flame. 3. By the falling of ſome great ſtone which is undermined by water, and ſtriking againſt another, produces ſome ſparks that ſet fire to the neighbouring combuſtible matter, which being a kind of natural gunpowder, at the appulſe of the fire goes off with a ſudden blaſt or violent exploſion, rumbling in the bowels of the earth, and lifting up the ground above it, ſo as ſometimes to make miſerable havock and devaſtation, till it gets vent or a diſcharge. Burning mountains and vulcanos are only ſo many ſpiracles ſerving for the diſcharge of this ſubterranean fire, when it is thus preternaturally aſſembled. And where there happens to be ſuch a ſtructure and conformation of the interior parts of the earth, that the fire may paſs freely and without impediment from the caverns therein, it aſſembles into theſe ſpiracles, and then readily and eaſily gets out from time to time without ſhaking or diſturbing the earth. See the article VULCANO. But where a communication is wanting, or the paſſages are not ſufficiently large and open, ſo that it cannot come at the ſaid ſpiracles, without firſt forcing and removing all obſtacles, it heaves up and ſhocks the earth, till it hath made its way to the mouth of the vulcano; where it ruſheth forth, ſometimes in mighty flames, with great velocity, and a terrible bellowing noiſe.

Earthquakes are ſometimes confined to a narrow ſpace, which is properly the effect of the re-action of the fire; and they ſhake the earth juſt as the exploſion of a powder-magazine cauſes a ſenſible concuſſion at the diſtance of ſeveral leagues. Thus a violent eruption of Ætna, will cauſe an earthquake over all the iſland of Sicily; but it will never extend to the diſtance of three or four hundred leagues. In like manner, when ſome new vents of fire have been formed in mount Veſuvius, there are felt at the ſame time earthquakes at Naples, and in the neighbourhood of the vulcano; but theſe concuſſions have never ſhaken the Alps, nor been communicated to France, or other countries remote from Veſuvius.

Sometimes they are felt at conſiderable diſtances, and ſhake a long tract of ground without any eruption or vulcano appearing. We have inſtances of earthquakes which were felt at the ſame time in England, France, Germany, and Hungary, and theſe extend always a great deal more in length than in breadth; the earthquake, on the 1ſt of Nov. 1755, which deſtroyed Liſbon, extended from north to ſouth 2500 miles with the utmoſt violence: it appears to have begun in Greenland, and paſſing ſouthward was perceived in the iſlands of Trinity, Ferro, &c. ſome of the weſtern iſles of Scotland, in Ireland, in the ſouth weſt part of England, &c. and paſſing under the ocean ſhook all Portugal and great part of Spain, whence it paſſed to the continent of Africa with incredible violence, and having ſhook the kingdoms of Fez and Morocco, probably vented itſelf in the ſouthern ocean. Earthquakes ſhake a tract of ground with more or leſs violence in different places, in proportion as it is remote from the fire; and they are almoſt always accompanied with a dull noiſe like that of a heavy carriage rolling along with great rapidity. See Phil. Tr. nº 157. Woodward's Eſſay, and M. de Buffon's Hiſt. Nat. &c.

Dreadful effects of EARTHQUAKES. Catanea, a city of Sicily, which was almoſt totally deſtroyed in the year 1693, is a melancholy inſtance of the dreadful effects of earthquakes. The ſhock was not only felt all over Sicily, but likewiſe in Naples and Malta; and it was ſo violent, that people could not ſtand upon their legs; and thoſe who lay on the ground, were toſſed from ſide to ſide, as if on a rolling billow. The earth opened in ſeveral places, throwing up large quantities of water; and great numbers periſhed in their houſes by the fall of rocks that were rent from the mountains. The ſea was violently agitated, and roared dreadfully: mount Ætna threw up vaſt ſpires of flame, and the ſhock was attended with a noiſe exceeding the loudeſt claps of thunder. Fifty-four cities and towns, with an incredible number of villages, were either deſtroyed or greatly damaged; and it was computed that near 60,000 perſons periſhed in different parts of the iſland, of whom 18,000 were inhabitants of Catanea. In 1746, the city of Lima, and port of Callao in Peru, ſuffered prodigiouſly from an earthquake. All the buildings of Callao, except one tower, were ſunk in the ſea, and conſequently all the inhabitants drowned: of five and twenty ſhips that were in the port, four were carried a league up the country, and the reſt ſwallowed up by the waves. At Lima, which is a pretty large city, only ſeven and twenty houſes remained ſtanding: a great number of people were cruſhed to death, eſpecially monks and nuns, becauſe their monaſteries were higher, and built of more ſolid materials than the other houſes. The ſhock laſted fifteen minutes. The earthquake which proved ſo fatal to Portugal in 1755, did no damage to Great Britain or Ireland, though it was felt in both countries, probably from its lying very deep under the ſurface of the earth. The inhabitants of the city of Oporto were alarmed with a rumbling noiſe before the ſhock, by which the whole city was ſhaken, ſeveral chimnies, ſtones, and croſſes were thrown down, and ſome churches opened at top; the river retiring about twenty yards returned with great violence, and a horrid noiſe; and two large ſhips lying without the bar, the ſea roſe in one great wave and brought them clear over the bar, and places that were before dry, into the river. The ſame ſhock was equally violent at Madrid, Seville, and Cadiz, and at this laſt-mentioned place the ſea roſe in a wave between ſixty and ſeventy feet high, and with the utmoſt violence daſhed againſt the rocks on the weſt part of the town, and againſt the walls with ſuch fury as to beat in the breaſt-work, and about eighty yards of the wall in length, broke into the town and overflowed the ſtreets, by which a great many periſhed. At Liſbon the firſt ſhock laſted near eight minutes with the utmoſt violence, in which time almoſt all the public edifices and moſt of the other houſes of that ſuperb capital were thrown down, and upwards of fifty thouſand people buried in the ruins. During this ſhock, which was attended with ſuch a horrid noiſe, that moſt people apprehended the diſſolution of the world, the earth trembled to that degree that people could ſcarce keep upon their legs. This ſhock in about fifteen minutes was followed by another no leſs violent, during which the earth opened in ſeveral places, and having ſwallowed whole ſtreets, threw up dreadful quantities of fire, water, and ſmoke. At the ſame time the water in the river roſe up ſeveral yards perpendicularly. Several veſſels were ſwallowed in the Tagus by the agitation of the waters, or ſunk by the fall of the buildings ſituated on the banks of that river.

There is no place of note in the kingdoms of Portugal and Algarva but ſhared more or leſs in this calamity. Some of the principal mountains have been ſplit, and large maſſes of them rolled down into the adjacent vallies. At Faro upwards of 3000 of the inhabitants were buried in the ruins of their houſes, and great part of the cities of Malaga, Port St. Mary, St. Lucar, &c. were deſtroyed. From the ſouth-coaſts of Spain and Portugal, the earthquake paſſed under the ſea over to Africa, and deſtroyed great part of the city and port of Algiers, and other cities upon the coaſt of Barbary; and ſince then other parts of Africa, and great part of Syria have been laid waſte by earthquakes. See an account of a terrible earthquake that happened at Jamaica in 1692, in Phil. Tr. n° 209, and an account of other earthquakes in n° 462, 463. See alſo Buffon's Hiſt. Nat. tom. 1.

Suppoſed effects of EARTHQUAKES. In 1758, Mr. Lomonoſow preſented a paper to the Royal Academy of Sciences at Peterſburg, endeavouring to ſhew, that the formation of metals is a neceſſary conſequence of earthquakes. The interior parts of the globe, ſays he, abound with ſulphureous matter, which occaſions that extraordinary heat, and thoſe fires, of whoſe exiſtence the vulcanos are evident proofs. Theſe internal fires, when pent up and finding no vent, are frequently ſo violent as by increaſing the elaſticity of the confined air, to give riſe to earthquakes; by the agitation of which are occaſioned a multitude of cavities near the earth's ſurface. In the formation of theſe cavities, it is pretended, there are abſorbed large quantities of foſſile ſubſtances mixed with vegetable ſalts, produced from the decompoſition of the trees and plants, whoſe diſſolved ſalts find their way by means of the rivers to the ſea. Now the fire acting in theſe cavities on the foſſile ſubſtances, and the vegetable ſalts contained therein, reduces the whole into a mineral ſtate; after which, the minerals ſo conſtituted are in a manner diſſolved by the fire, and diſtributed into beds and veins, in the manner they are found to exiſt in the mine.

Artificial EARTHQUAKES. Chemiſtry furniſhes us a method of making artificial earthquakes, which ſhall have all the great effects of natural ones: this method, as it may illuſtrate the proceſs of nature in the production of theſe terrible phænomena, we ſhall here add.

To twenty pounds of iron filings, add as many of ſulphur: mix, work and temper the whole together with a little water, ſo as to form a maſs of the conſiſtence of a firm paſte. This, being buried three or four feet under ground, in ſix or ſeven hours time, will have a prodigious effect: the earth will begin to tremble, crack and ſmoke, and fire and flame will burſt through.

Such is the effect even of two cold bodies, in the cold ground, and there only wants a ſufficient quantity of this mixture to produce a true Ætna. If it were ſuppoſed to burſt out under the ſea, it would produce a water-ſpout; and if it were in the clouds, the effect would be thunder and lightening.

EASE, among ſailors. See EASING.

EASEL-PIECES, a denomination given by painters to ſuch pieces as are contained in frames, in contradiſtinction from thoſe painted on ceilings, *&c.*

EASEMENT, in law, a privilege or convenience which one neighbour has of another, whether by charter or preſcription, without profit: ſuch are a way through his lands, a ſink, or the like. Theſe, in many caſes, may be claimed.

EASING, in the ſea-language, ſignifies the ſlackening a rope, or the like: thus, to eaſe the bow-line or ſheet, is to let them go ſlacker; to eaſe the helm, is to let the ſhip go more large, more before the wind, or more larboard.

EASLOW, a borough of Cornwall, twenty-two miles ſouth of Launceſton, which ſends two members to parliament.

EAST, one of the four cardinal points of the world; being that point of the horizon, where the ſun is ſeen to riſe when in the equinoctial. See COMPASS, HORIZON, EQUINOCTIAL, *&c.*

EAST is alſo frequently compounded with other words, as eaſt-indies, eaſt-dial, eaſt-wind, *&c.* to ſignify their being ſituated towards the eaſt. See the articles INDIES, DIAL, WIND, *&c.*

EASTER, a feſtival of the chriſtian church, obſerved in memory of our Saviour's reſurrection.

The Greeks call it πασχα, the Latins, *paſcha*; an hebrew word ſignifying *paſſage*, applied to the jewiſh feaſt of the paſſover, to which the chriſtian feſtival of eaſter correſponds. It is called eaſter in the Engliſh, from the goddeſs Eoſtre, worſhipped by the Saxons with peculiar ceremonies in the month of April. See the article PASSOVER.

The obſervation of this feſtival, is as antient as the very time of the apoſtles. In the primitive ages of the church, there were very great diſputes about the particular time when this feſtival was to be kept. The aſiatic churches kept their eaſter upon the very ſame day the Jews obſerved their paſſover; and others, on the firſt Sunday after the firſt full moon in the new year. This controverſy was determined in the council of Nice, when it was ordained that Eaſter ſhould be kept upon one and the ſame day, which ſhould always be a Sunday, in all chriſtian churches throughout the world.

But though the chriſtian churches differed as to the time of celebrating eaſter, yet they all agreed in ſhewing particular reſpect and honour to this feſtival: hence, in antient writers, it is diſtinguiſhed by the name of *dominica gaudii*, i. e. Sunday of joy. On this day priſoners and ſlaves were ſet free, and the poor liberally provided for. The eve, or vigil, of this feſtival was celebrated with more than ordinary pomp, which continued till midnight, it being a tradition of the church that our Saviour roſe a little after midnight; but in the eaſt, the vigil laſted till cock-crowing.

It was in conformity to the cuſtom of the Jews, in celebrating their paſſover on the fourteenth day of the firſt month, that the primitive fathers ordered, that the fourteenth day of the moon, from the calendar new moon, which immediately follows the twenty-firſt of March, at which time the vernal equinox happened upon that day, ſhould be deemed the paſchal full moon, and that the Sunday after ſhould be eaſter-day; and it is upon this account that our rubric has appointed it upon the firſt Sunday after the firſt full moon immediately following the twenty-firſt day of March. Whence it appears, that the true time for celebrating eaſter, according to the intention of the council of Nice, was to be the firſt Sunday after the firſt full moon following the vernal equinox, or when the ſun entered into the firſt point of aries; and this was pope Gregory's principal view in reforming the calendar, to have eaſter celebrated according to the intent of the council of Nice.

Having firſt found the epact and dominical letter, according to the method delivered under theſe articles, eaſter-day may be found by the two follwing rules.

1. To find eaſter-limit, or the day of the paſchal full moon, counted from March 1 incluſive, the rule is this: add 6 to the epact, and if this ſum exceeds 30, take 30 from it; then from 50 ſubſtract this remainder, and what is left will be the limit; if the ſum of the epact, added to 6, does not amount to 30, it muſt be ſub-

ſtracted from 50, and the remainder is the limit required; which is never to exceed 49, nor fall ſhort of 21.

2. From the limit and dominical letter, to find eaſter-day: add 4 to the dominical letter; ſubſtract this ſum from the limit, and the remainder from the next higher number which contains 7 without any remainder; laſtly, add this remainder to the limit, and their ſum will give the number of days from the firſt of March to eaſter-day, both incluſive.

Thus, to find eaſter-day for the year 1754, for inſtance. Firſt find the epact 6, which added to 6 gives 12; and as this ſum does not amount to 30, it muſt be ſubſtracted from 50, and the remainder 38 is the limit. Then adding 4 to 6, the number of the dominical letter F, ſubſtract this ſum, *viz.* 10, from the limit 38, and the remainder 28 from 35, the next ſuperior number that contains 7 a certain number of times without any remainder, and there remains 7, which being added to the limit 38, gives 45 for the number of days from the firſt of March to eaſter-day, both incluſive: hence, allowing 31 for March, there remains the 14th of April for eaſter-day. Here follows the operation at length.

$6 + 6 = 12$

$50 - 12 = 38 =$ paſchal limit

Dominical letter $F = 6$

$6 + 4 = 10$, and $38 - 10 = 28$; then $35 - 28 = 7$. And

$38+7=45$; from which ſubſtracting

$\underline{31}$, the number of days in March,

14 there remains 14, the day of April anſwering to eaſter-day for the year 1754.

However, to ſave the trouble of calculation, we ſhall here give a table, by which eaſter-day may be found by inſpection till the year 1900, according to the gregorian or new ſtile.

Golden Number.	DOMINICAL LETTERS.						
	A.	B.	C.	D.	E.	F.	G.
I	April 16	17	18	19	20	14	18
II.	April 9	3	4	5	6	7	8
III,	March 26	27	28	29	23	24	25
IV.	April 16	17	11	12	13	14	15
V.	April 2	3	4	5	6	March 31	April 1
VI.	April 23	24	25	19	20	21	22
VII.	April 9	10	11	12	13	14	8
VIII.	April 2	3	March 28	29	30	31	April 1
IX.	April 16	17	18	19	20	21	22
X.	April 9	10	11	5	6	7	8
XI.	March 26	27	28	29	30	31	25
XII.	April 16	17	18	19	13	14	15
XIII,	April 2	3	4	5	6	7	8
XIV.	March 26	27	28	22	23	24	25
XV,	April 16	10	11	12	13	14	15
XVI.	April 2	3	4	5	March 30	31	April 1
XVII.	April 23	24	18	19	20	21	22
XVIII.	April 9	10	11	12	13	7	8
XIX.	April 2	March 27	28	29	30	31	April 1

As to the uſe of this table, eaſter-day will be found in the common angle of meeting of the given dominical letter and the golden number; the name of the month lying in a direct line with it, towards the left hand.

EATON, a town of Buckinghamſhire, ſituated on the north ſide of the Thames, oppoſite to Windſor, and famous for its collegial ſchool founded by king Henry VI. being a ſeminary for king's college Cambridge, the fellows of which are all from this ſchool.

EAVES, in architecture, the margin or edge of the roof of an houſe; being the loweſt tiles, ſlates, or the like, that hang over the walls, to throw off water to a diſtance from the wall. See the articles WALL and ROOF.

EAVES-LATH, a thick feather-edged board, generally nailed round the eaves of a houſe, for the lowermoſt tiles, ſlates, or ſhingles to reſt on.

EBDOMARIUS, in eccleſiaſtical writers, an officer formerly appointed weekly to ſuperintend the performance of divine ſervice in cathedrals, and preſcribe the duties of each perſon attending in the choir, as to reading, ſinging, praying, &c.

EBIONITES, in church-hiſtory, heretics of the firſt century, ſo called from their leader Ebion.

They held the ſame errors with the Nazareens, united the ceremonies of the moſaic inſtitution with the precepts of the goſpel, obſerved both the jewiſh ſabbath and chriſtian Sunday, and in celebrating the euchariſt, made uſe of unleavened bread. They abſtained from the fleſh of animals, and even from milk. In relation to Jeſus Chriſt, ſome of them held that he was born, like other men, of Joſeph and Mary, and acquired ſanctification only by his good works. Others of them allowed, that he was born of a virgin, but denied that he was the word of God, or had any exiſtence before his human generation. They ſaid, he was, indeed, the only true prophet, but yet a mere man, who by his virtue had arrived at being called Chriſt, and the ſon of God. They alſo ſuppoſed, that Chriſt and the devil were two principles, which God had oppoſed to each other. Of the New Teſtament, they only received the goſpel of St. Matthew, which they called the goſpel according to the Hebrews. See the article NAZAREANS.

EBLIS, the name uſed by the mahometans for the devil. See the article DEVIL.

EBONY, the wood of a tree ſuppoſed to be of the palm kind, which is imported from different countries of the Eaſt and Weſt-Indies. This wood is extremely ſolid, and capable of a fine poliſh; and, therefore, much uſed in toys and marquetry.

EBRBUHARITES, a kind of mahometan monks, ſo called from their founder Ebrbuhar.

They make great profeſſion of piety, and contempt of the world; but are accounted heretics by the reſt of the mahometans, becauſe they believe themſelves not obliged to go in pilgrimage to Mecca.

EBRILLADE, in the manege, a check of the bridle given to the horſe by a jerk of one rein, when he refuſes to turn. Some confound the ebrillade with the ſaccade. See the article SACCADE.

As the ebrillade is a chaſtiſement, and not aid, the uſe of it is baniſhed the academies.

EBRO, antiently IBERUS, a large river of Spain, which, taking its riſe in old Caſtile, runs through Biſcay and Arragon, paſſes by Saragoſa, and continuing its courſe through Catalonia, diſcharges itſelf with great rapidity into the Mediterranean, about twenty miles below the city of Tortoſa.

EBULLITION, the ſame with boiling. See the article BOILING.

This term is alſo uſed in a ſynonymous ſenſe with efferveſcence. See the article EFFERVESCENCE.

ECAVESSADE, in horſemanſhip, denotes a jerk of the cavezon. See CAVEZON.

ECCANTHIS, the ſame with encanthis. See the article ENCANTHIS.

ECCENTRIC and ECCENTRICITY. See EXCENTRIC and EXCENTRICITY.

ECCHO, or ECHO. See the article ECHO.

ECCHYMOSIS, εκχυμωσις, in ſurgery, an extravaſation of the blood from a vein betwixt the fleſh and ſkin; an accident too common, after bleeding in the arm.

There are various degrees of an ecchymoſis, ſo that the arm is hereby not only much ſwelled, and of a black and blue colour, but is even ſometimes violently inflamed with a moſt acute pain, and followed either with a ſuppuration or incipient mortification in the limb. This accident frequently proceeds from the vein's being cut quite aſunder by the phlebotomiſt, but oftener from the patient's uſing his arm too early after bleeding, in violent and long exerciſes, in which the contractions of the muſcles make the veins ſwell, and force their blood through the orifice into the interſtices betwixt the fleſh and ſkin, either in a greater or leſs quantity, in proportion to the degree of violence and exerciſe.

In a ſlight ecchymoſis, there is little to be feared, as the ſtagnant blood may be generally diſperſed without any great difficulty by the application of a compreſs dipt in vinegar and ſalt, or in ſpirit of wine. Sometimes the blood ſuppurates, which may be promoted by a diachylon-plaſter; and when the matter is once brought to maturity, it generally makes its own way through the integuments, without any inciſion; after which, being diſcharged, the wound may be healed by a bit of diachylon-plaſter. If the ſtagnating blood be very large, there are no hopes left to diſperſe it: then the diſorder is in danger of terminating either in a large abſceſs or a gangrene: but to prevent theſe conſequences, the ſurgeon ſhould ſcarify, and make little inciſions upon the hard part to diſcharge the blood, and then apply diachylon-plaſter; and if the vein is already poſſeſſed with a violent inflammation or gangrene, it ſhould be well ſcarified and inveſted with diſcutient cataplaſms. At the ſame time it is neceſſary to bleed in ſome other part, and to adminiſter attenuating medicines internally till it abates, or the gangrene ſpreads no farther.

ECCLESIA, in law, ſignifies a church or parſonage. See the articles CHURCH and PARSONAGE.

ECCLESIASTES, a canonical book of the Old Teſtament, the deſign of which is to ſhew the vanity of all ſublunary things.

It was compoſed by Solomon, who enumerates the ſeveral objects on which men place their happineſs, and then ſhews the inſufficiency of all worldly enjoyments. The Talmudiſts make king Hezekiah to be the author of it; Grotius aſcribes it to Zorobabel, and others to Iſaiah; but the generality of commentators believe this book to be the produce of Solomon's repentance, after having experienced all the follies and pleaſures of life.

ECCLESIASTIC, or ECCLESIASTICAL, an appellation given to whatever belongs to the church: thus we ſay, eccleſiaſtical polity, juriſdiction, hiſtory, *&c.* See POLITY, JURISDICTION, HISTORY, *&c.*

Eccleſiaſtical juriſdiction may be exerciſed by doctors of the civil law, though they are laymen.

ECCLESIASTICUS, an apocryphal book, generally bound up with the ſcriptures, ſo called from its being read in the church, *eccleſia*, as a book of piety and inſtruction, but not of infallible authority.

The author of this book was a Jew, called Jeſus the ſon of Sirach. The Greeks call it the wiſdom of the ſon of Sirach.

ECHAPE, in the manege, a horſe begot between a ſtallion and a mare of different breeds and countries.

ECHAPER, in the manege, a gallicism uſed in the academies, implying to give a horſe head, or to put on at full ſpeed.

ECHAUGETTE, in the military art, denotes a guerite of wood, and of a ſquare form. See the article GUERITE.

ECHENEIS, in ichthyology, a genus of malacopterygious fiſhes, whereof the branchioſtege membrane on each ſide contains about nine oſſicles or ſmall bones: its head is flat on the upper part, and marked with a number of rough tranſverſe ſtriæ, or ridges.

Of this genus, there is only one known ſpecies, the remora of authors. See the article REMORA.

ECHEVIN, *ſcabinus*, in the french and dutch polity, a magiſtrate elected by the inhabitants of a city or town, to take care of their common concerns, and the decoration and cleanlineſs of the city.

At Paris, there is a prevot, and four echevins; in other towns, a mayor and echevins. At Amſterdam, there are nine echevins; and, at Rotterdam, ſeven.

In France, the echevins take cognizance of rents, taxes, and the navigation of rivers, *&c.* In Holland, they judge of civil and criminal cauſes; and if the criminal confeſſes himſelf guilty, they can ſee their ſentence executed without appeal.

Echevin of the palace, an officer of the houſhold under the firſt race of the french kings.

ECHINATE, or ECHINATED, an appellation given to whatever is prickly, thereby reſembling the hedge-hog.

ECHINITES, in natural hiſtory, the name by which authors call the foſſile centronia, frequently found in our chalk-pits. See the article CENTRONIA.

ECHINOPHORA, in botany, a genus of the pentandria-digynia claſs of plants, the corolla of which conſiſts of five unequal patulous petals: it has no pericarpium; the general involucrum is of a turbinated figure; and the ſeeds are two in number, and of an oblong form.

ECHINOPS, or ECHINOPUS, GLOVE-THISTLE, in botany, a genus of the ſyngeneſia-polygamia-æqualis claſs of plants, the flower of which is compound; conſiſting of a great number of floſcules or ſmall flowers, divided into ſeveral acute ſegments: there is no pericarpium: the ſeed, which is ſingle, is of an ovato-oblong figure, narrower at the baſe, with an obtuſe hairy apex. See plate LXXXII. fig. 2.

The roots and ſeeds of this plant are ſaid to be attenuant and diuretic.

ECHINUS, in zoology, a name frequently uſed for the erinaceus, or common hedge-hog. See the article ERINACEUS.

ECHINUS, in architecture, a member or ornament near the bottom of the ionic, corinthian, and compoſite capitals.

ECHIUM, VIPER'S BUGLOSS, in botany, a genus of the pentandria-monogynia claſs of plants; the flower of which conſiſts of a ſingle petal, the tube being very ſhort, and the limb erect, growing gradually wider at the extremity, where it is divided into five unequal ſegments; the two upper ſegments are longer than the reſt, and the loweſt one is ſmall, acute, and reflex; there is no pericarpium, inſtead of which the cup becomes rigid, and contains in it four roundiſh and obliquely accuminated ſeeds. See plate LXXXII. fig. 3.

A powder of the root of this plant is recommended againſt epilepſies: it is alſo a ſudorific, vulnerary, and preſcribed againſt the eryſipelas.

ECHO, a ſound reverberated or reflected to the ear from ſome ſolid body.

Whereas the undulatory motion of the air, which conſtitutes ſound, is propagated in all directions from the ſounding body, it will frequently happen that the air, in performing its vibrations, will impinge againſt various objects, which will reflect it back, and ſo cauſe new vibrations the contrary way: now if the objects are ſo ſituated as to reflect a ſufficient number of vibrations back, *viz.* ſuch as proceed different ways, to the ſame place, the ſecond will be there repeated, and is called an echo: and the greater the diſtance of the object is, the longer will be the time before the repetition is heard: and when the ſound, in its progreſs, meets with objects at different diſtances, ſufficient to produce an echo, the ſame ſound will be repeated ſeveral times ſucceſſively, according to the different diſtances of theſe objects from the ſounding body, which makes what is called a repeated echo. See the articles Sound and Reflection.

In order to account for the nature of echoes, we muſt conſider that ſound is perceived as coming from that place from which, as a center, the pulſes are propagated. This is well known by experience; but to illuſtrate the matter, let A (plate LXXXII. fig. 4.) be the center from whence any ſound is directly propagated, and ſtrikes againſt any plane obſtacle B C, ſufficiently large; draw A F perpendicular to B C, and produce it to H, ſo that it may be $AF=FH$; the ſound reflected will be perceived, as coming from the point H. For let A E be the incident ray, impinging againſt the obſtacle B C, in the point E; from E draw the ray E D in ſuch a manner that the angle C E D may be equal to the angle F E A, or that the angle of incidence may be equal to the angle of reflection; then will E D be the reflected ray of ſound, and if produced will paſs thro' the point H; for the angle $FEH=CED=FEA$. Therefore in the triangle A F E and E F H, ſince the angles of the one are reſpectively equal to the angles of the other; and the ſide E F is common to both, the ſides of one triangle will be reſpectively equal to the ſides of the other; and therefore $HF=AF$. Wherefore the reflex ſound will be heard by a perſon at D, as coming from the point H. As the place of the auditor, or point D, approaches towards A, the caſe will conſtantly be the ſame with reſpect to the center of ſound H; the triangles will ſtill be equal, and all their angles and ſides reſpectively; and therefore when D coincides with H, the reflex ſound or echo will be heard from the point H, which was to be demonſtrated.

The ſame ſound is alſo heard twice by an auditor at D; firſt by the direct ray A D, and ſecondly by the reflex ray A E D, provided the difference between A D and A E D be ſufficiently great, that the direct and reflex ſounds do not, in the ſame ſenſible moment of time, affect the ear: for if the reflex ſound arrives at the ear before the impreſſion of the direct ſound ceaſes, the ſound will not be double, only rendered more intenſe.

From the velocity of ſound it follows, that a perſon ſpeaking or uttering a ſentence in A aloud, in order to obſerve the echo by reflection from the obſtacle B C, ought to ſtand at leaſt 73 or 74 feet from it, that is, $AF=74$: and ſince at the common rate of ſpeaking, we pronounce not above $3\frac{1}{2}$ ſyllables per ſecond; therefore, that the echo may return juſt as ſoon as the three ſyllables are expreſſed, we muſt have twice A F equal to 1000 feet, or the ſpeaker muſt ſtand about 500 feet from the obſtacle B C, and ſo in proportion for any other number of ſyllables.

Echo, in architecture, a term applied to certain kinds of vaults and arches, moſt commonly of elliptical and parabolical figures, uſed to redouble ſounds, and produce artificial echoes.

We learn from Vitruvius, that in ſeveral parts of Greece, and Italy, there were brazen veſſels artfully ranged under the ſeats of the theatres, to render the ſound of the actors voices more clear, and make a kind of echo. A ſingle arch or concavity can ſcarce ever ſtop and reflect the ſound; but if there be a convenient diſpoſition between it, part of the ſound that is propagated thither, being collected and reflected as before, will preſent another echo; or if there be another concavity oppoſed at a due diſtance to the former, the ſound reflected from the one upon the other will be toſſed back again upon this latter, &c.

ECHO, in poetry, a kind of compoſition wherein the laſt words or ſyllables of each verſe contain ſome meaning, which being repeated apart, anſwers to ſome queſtion or other matter contained in the verſe, as in this beautiful one from Virgil:

Crudelis mater magis, an puer improbus ille?
Improbus ille puer, crudelis tu quoque mater.

The elegance of an echo conſiſts in giving a new ſenſe to the laſt words; which reverberate, as it were, the motions of the mind, and by that means affect it with ſurpriſe and admiration.

ECHOMETER, among muſicians, a kind of ſcale or rule, with ſeveral lines thereon, ſerving to meaſure the duration and length of ſounds, and to find their intervals and ratios.

ECLECTICS, *eclectici*, antient philoſophers, who, without attaching themſelves to any particular ſect, ſelected whatever appeared to them the beſt and moſt rational, from each.

Potamon of Alexandria was the firſt of the eclectics: he lived in the reigns of Auguſtus and Tiberius; and being tired with the ſcepticiſm of the pyrrhonians, he reſolved upon a ſcheme that would allow him to believe ſomething, but without being ſo implicit as to ſwallow any entire hypotheſis.

ECLIPSE, in aſtronomy, the deprivation of the light of the ſun, or of ſome heavenly body, by the interpoſition of another heavenly body between our ſight and it. Thus, eclipſes of the ſun happen by the moon's intervening between it and the earth; by which means the ſhadow of the moon falls upon the earth, when the latitude of the moon does not prevent it, by elevating the moon above, or depreſſing it below the earth. On the other hand, an eclipſe of the moon can only happen when the earth is interpoſed between the ſun and it; for then, if the latitude of the moon does not prevent it, the ſhadow of the earth may fall on the moon, and thereby cauſe either a partial or total eclipſe. A total eclipſe of the ſun or moon is when their whole bodies are obſcured; and a partial one is when part only of their bodies is darkened: again, a central eclipſe is when it is not only total, but the eclipſed body paſſes through the center of the ſhadow.

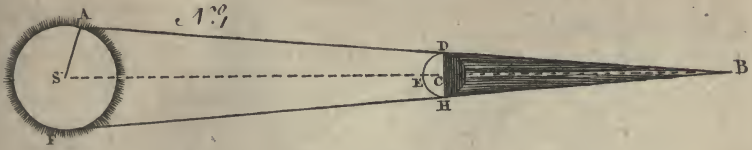
Aſtronomy of ECLIPSES. The ſun being a luminous body, vaſtly larger than the earth, will enlighten ſomewhat more than one half of it, and cauſe it project a long conical ſhadow, as repreſented in plate LXXXIII. n° 1. where S is the ſun, E the earth, and H B D its conical ſhadow.

The height or length of this ſhadow, at the mean diſtance of the ſun, may be found by this proportion: as the tangent of the angle C B D, or the ſemi-diameter under which the ſun appears at the earth, *viz.* A S = 16′ : radius : : 1 : the length of the ſhadow C B = 214.8 ſemi-diameters of the earth: but when the ſun is at its greateſt diſtance, the length of the ſhadow C B will be equal 217 of theſe ſemi-diameters. Hence it appears, that though the height of the ſhadow is near three times as great as the mean diſtance of the moon, yet it falls far ſhort of the diſtance of mars, and conſequently can eclipſe none of the heavenly bodies but the moon.

To find the height of the moon's ſhadow, ſuppoſed to be ſimilar to that of the earth, and conſequently proportional to the diameters of the baſes, the proportion is, as the diameter of the earth 100 to the diameter of the moon 28, ſo is the mean altitude of the earth's ſhadow, 214.8 to the altitude of that of the moon $60\frac{144}{1000}$ of the earth's ſemi-diameters. The ſhadow of the moon therefore will juſt reach the earth in her mean diſtance, which it cannot do in her apogee; but in her perigee it will involve a ſmall part of the earth's ſurface.

Beſides the dark ſhadow of the moon, there is another, called the penumbra; to repreſent which, let S (plate LXXXIV. n° 2.) be the ſun, T the earth, D the moon, K C F and A B E the two lines touching the oppoſite limbs of the ſun and moon; then it is evident that C F E B will be the dark or abſolute ſhadow of the moon, in which a perſon on the earth's ſurface, between F and E, is wholly deprived of the ſun's light. Again, let K B G and A C H be two other lines touching the ſides of the ſun and moon alternately, and interſecting each other at the point I above the moon; then will H C B G, a fruſtum of the cone G I H, be the penumbra above-mentioned, in which a ſpectator on the earth's ſurface, between F and H, and E and G, will ſee part of the ſun, whilſt the reſt is eclipſed.

ECLIPSE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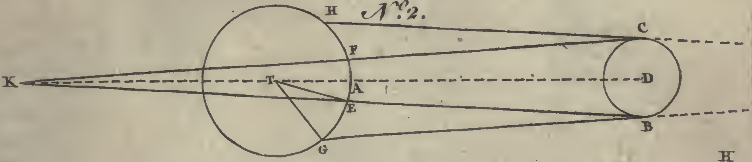
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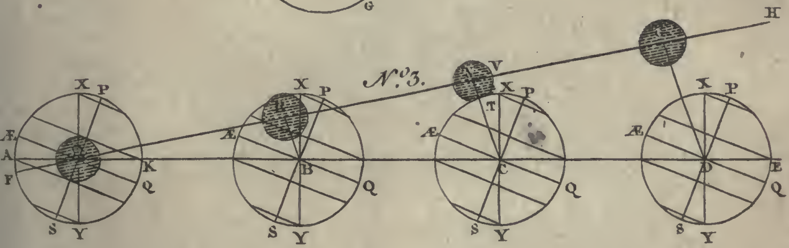
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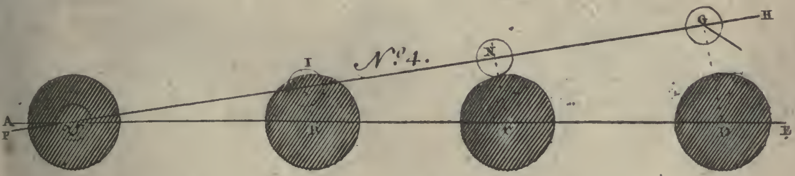
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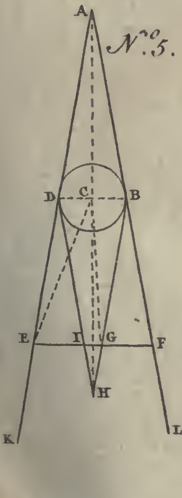
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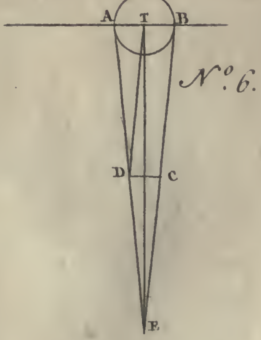
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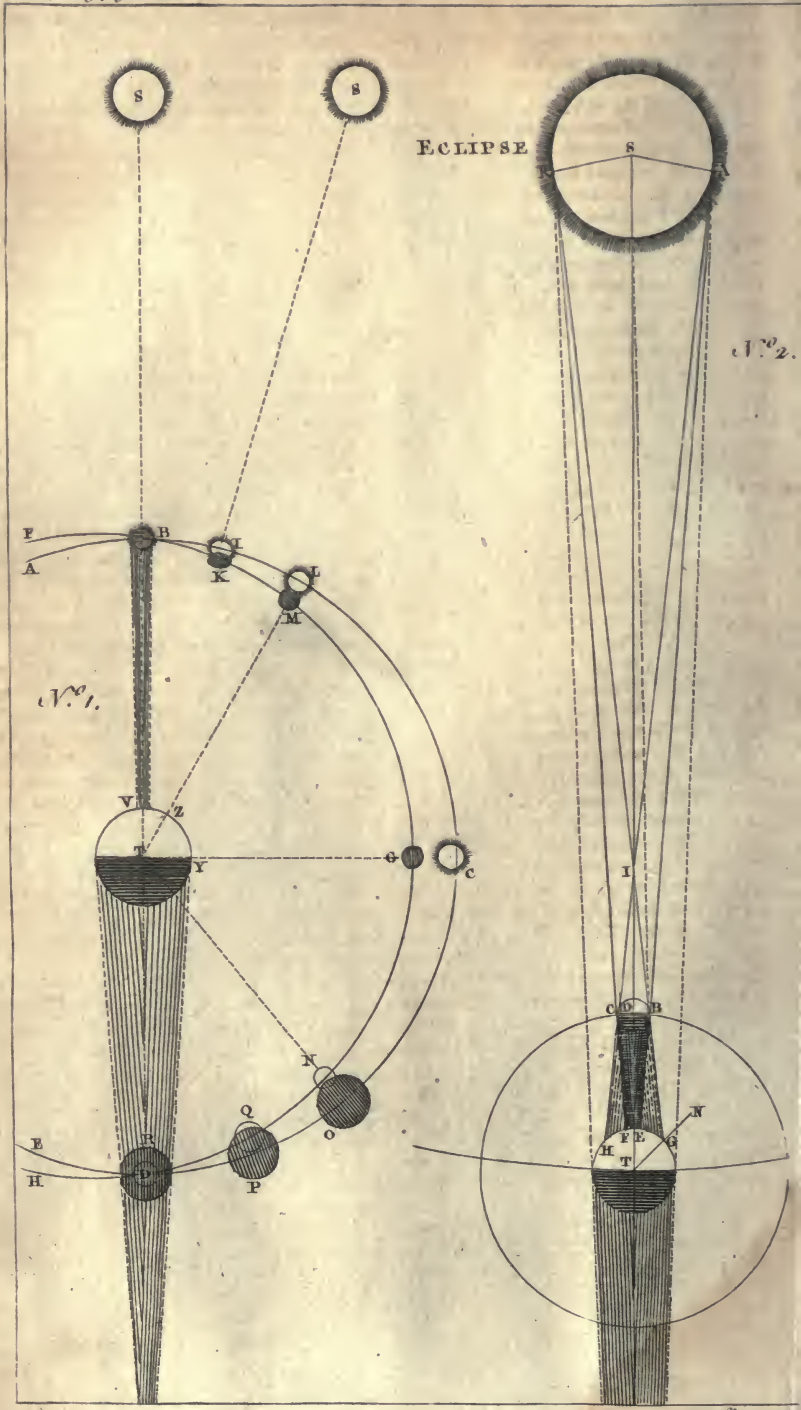
J. Jefferys



T. Jefferys sculp

To calculate the angle of the cone HIG, draw SB; then in the oblique triangle BIS, the external angle BID is equal to both the internal and oppoſite angles IBS and ISB; but ISB, the angle under which the ſemi-diameter appears at the ſun, being inſenſibly ſmall, the angle BID will be equal to IBS, or KBS, equal to the apparent ſemi-diameter of the ſun. Therefore the part of the penumbral cone CIB is equal and ſimilar to the dark ſhadow of the moon.

Next, to find how much of the earth's ſurface can be at any time involved in the moon's dark ſhadow, or the quantity of the arch EF (plate LXXXIII. n° 2.) let us ſuppoſe the ſun to be in apogee, and the moon in perigee; and, in this caſe, the height of the moon's ſhadow will be about 61 ſemi-diameters, and the diſtance of the moon about 56; that is $DK=61$, $DT=56$, and $TE=1$. In this caſe alſo, the half angle of the ſhadow $TKE=15' 50''$, as being leaſt of all. Then the proportion is: as 1, or the ſide TE to the ſide $TK=5$; ſo is the ſine of the ſemi-angle $TKE=15' 50''$ to the ſine of the angle $TEK=1^\circ 19' 10''$. Wherefore $TEK+TKE=ATE=AE=1^\circ 35'$; the double of which FE is $3^\circ 10'=190'$, or 220 miles, the diameter of the dark ſhadow on the ſurface of the earth when greateſt.

After a like manner you may find the diameter of the penumbral ſhadow at the earth, GEFH (plate LXXXIV. n° 2.) when greateſt of all, that is, when the earth is in perihelio, and the moon in apogee; for then will the ſun's apparent diameter be equal to $16' 23''=TIG$, the greateſt ſemi-angle of the cone; and thence we ſhall find $ID=58\frac{1}{2}$ ſemi-diameters of the earth. In this caſe alſo, the diſtance of the moon from the earth is $DT=64$ ſemi-diameters. Therefore as $TG=1$ to $TI=122\frac{1}{2}$, ſo is the ſine of the angle $TIG=16' 23''$ to the ſine of the angle $IGN=35^\circ 42'$. But $IGN=TIG+ITG$, and therefore $ITG=IGN-TIG=35^\circ 25'$; the double of which $70^\circ 50'=GEFH=4900$ engliſh miles nearly, for the diameter of the penumbral ſhadow when greateſt.

From the principles of optics it is evident, that if the plane of the moon's orbit coincided with that of the earth's orbit, there would neceſſarily be an eclipſe of the ſun every new moon: thus, if S (plate LXXXIV. n° 1.) repreſent the ſun, B the moon, and T the earth, ſince the apparent magnitude or diſc of the ſun is nearly the ſame with that of the moon, it muſt neceſſarily be hid or eclipſed as often as the new moon came between the earth and the ſun. But if, as is really the caſe, the moon's orbit be not in the plane of the ecliptic, but inclined thereto under a certain angle, there may be a new moon, and yet no eclipſe of the ſun. To illuſtrate this, let ABCDE be a circle in the plane of the ecliptic, deſcribed at the diſtance of the moon's orbit FGH, interſecting the ſame in the points B and D, and making an angle therewith ABF, whoſe meaſure is the arch GC, as being 90° diſtant from the angular points or nodes B and D. Now it is evident if the arch GC be ſomewhat greater than the ſum of the apparent ſemi-diameters of the ſun and moon, then at G, and ſome diſtance from G towards B, there may be a new moon, and yet no eclipſe of the ſun; becauſe, in this caſe, the diſc of the moon G is too much elevated or depreſſed above or below the apparent diſc or face of the ſun C, to touch it, much leſs to hide or eclipſe any part thereof. But at a certain point M (*ibid.*) in the moon's orbit, the moon will have a latitude only equal to the ſum of the ſemi-diameters of the ſun and moon; and, therefore, when the moon is new in that point, ſhe will appear to a ſpectator in the point Z, to touch the ſun only; from whence this point M is called the ecliptic limit, inaſmuch as it is impoſſible there ſhould happen a new moon in any part between it and the node B on each ſide, without eclipſing the ſun leſs or more: thus, in the figure, may be ſeen a partial eclipſe at K, and a total one in the node itſelf B.

What has hitherto been ſaid regards the phænomenon of an eclipſe of the ſun, as it appears to a ſpectator on the earth's ſurface, in whoſe zenith the moon then is, and where there is no refraction to alter the true latitude of the moon: but when the moon has any latitude, there the proceſs of calculating the appearances of a ſolar eclipſe will be ſomewhat more complex, on account of the variation of the moon's latitude and longitude for every different altitude, and conſequently every moment of the eclipſe. See the articles REFRACTION and PARALLAX.

The beſt way of repreſenting a ſolar eclipſe is by a projection of the earth's diſc, and of the ſection of the dark and penumbral ſhadow, as they appear, or would appear, to a ſpectator at the diſtance of the moon in a right line joining the centers of the ſun and the earth. In order to this, we are to find the dimenſions of the apparent ſemi-diameters of the earth, dark ſhadow, and penumbra at the diſtance of the moon. As to the firſt, *viz.* the earth's ſemi-diameter, it is equal to the moon's horizontal parallax. That of the dark ſhadow is thus eſtimated: let C (plate LXXXIII. n° 5.) be the center of the moon, D B its diameter, D H B its dark ſhadow and K A L the penumbral cone. Then let E F be the diameter of the penumbra at the earth, and I G that of the dark ſhadow, and draw C G and C E; then is the angle $CGB=BHC+GCH$, and ſo $GCH=BGC-BHC$; that is, the apparent ſemi diameter of the dark ſhadow, is equal to the difference between the apparent ſemi-diameters of the ſun and moon. In like manner the angle $ECH=DEC+DAC$; that is, the apparent ſemi-diameter of the penumbra, at the earth, is equal to the ſum of the apparent ſemi-diameters of the moon and ſun. Now the ſemi-diameters of the ſun and moon, and alſo of the moon's horizontal parallax, are all ready calculated for their various diſtances from the earth, and for the leaſt, mean, and greateſt excentricity of the lunar orbit, in the aſtronomical tables. Therefore, let A E (plate LXXXIII. n° 3.) repreſent a ſmall portion of the annual orbit, and F H the viſible part of the center of the lunar ſhadows, which will exactly correſpond to the poſition of the moon's orbit with reſpect to the ecliptic in the heavens; ſo that the point of interſection ☊ will be the node, and the angle H ☊ E the angle of inclination of the lunar orbit to the plane of the ecliptic, which is about 5°. Hence, if Æ P Q S repreſent the diſc of the earth, according to the orthographic projection, in the ſeveral places ☊, B, C, D, whoſe ſemi-diameter is made equal to the number of minutes in the moon's horizontal parallax at the time of the eclipſe; and if, in the path of the ſhadows in the points ☊, R, N, G, we deſcribe a ſmall circle whoſe ſemi-diameter is equal to the difference of the ſemi-diameters of the ſun and moon, that will be the circular ſection of the moon's dark ſhadow at the diſtance of the earth: again, if a circle is deſcribed on the ſame center, with a ſemi-diameter equal to the ſum of the ſemi-diameters of the ſun and moon, it will repreſent the penumbral ſhadow, expreſſed by the dotted area. Here then it is evident, that if the moon, when new, be at the diſtance ☊ G *(ibid.)* from the node, the penumbral ſhadow will not fall near the earth's diſc, and ſo there cannot poſſibly happen an eclipſe. Again, if the moon's diſtance from the node be equal to ☊ N, the penumbral ſhadow will juſt touch the diſc, and conſequently ☊ C is the ecliptic limit, which may be found by the following analogy, *viz.* as the ſine of the angle N ☊ C = 5° 30′ (the angle of inclination of the lunar orbit to the plane of the ecliptic) is to the radius = 90°, ſo is the logarithm of the ſide $NC=TC+NT=62' 10''+16' 52''+16' 23''=95' 25''$ to the logarithm of the ſide ☊ C equal to the ecliptic limit, which is found to be 16° 36′, beyond which diſtance from the node ☊ there can be no eclipſe; and within that diſtance, if the moon be new, the ſhadow will fall on ſome part of the earth's diſc, as at B; where all thoſe places over which the ſhadows paſs, will ſee the ſun eclipſed, in part only by the dotted penumbral ſhadow; but the ſun will be centrally eclipſed in all places over which the center of the ſhadows paſs, and if the moon be new in the node, then will the center of the ſhadows paſs over the center of the diſc, as repreſented at ☊. In this caſe, if the apparent diameter of the moon be greater than that of the ſun, the face of the ſun will be wholly eclipſed to all places over which the center of the ſhadow paſſes; but if not, the ſun will only be centrally eclipſed, his circumference appearing in the form of a bright annulus, or luminous ring; the width whereof will be equal to the difference of the diameters of the luminaries. The diſc of the earth, here projected, repreſents the caſe of an eclipſe on an equinoctial day; A K being the ecliptic, Æ Q the equator, X Y the axis of the ecliptic, P S the axis of the equator, P and S the north and ſouth poles, *&c.* By this projection the paſſage of ſhadows over the earth's diſc may be exhibited for any place of the ſun, or declination of the moon.

As to the calculation of eclipſes of the ſun, it is at beſt but a troubleſome buſineſs, which depends upon the following data: 1. The mean conjunction, and from thence the true conjunction, together with the place of the luminaries at the apparent time of true conjunction. 2. The apparent time of the viſible new moon, at the apparent time of the true conjunction. 3. The apparent latitude at the apparent time of the viſible conjunction. From theſe data, the other quæſita may be obtained; ſo that the greateſt part of the trouble ariſes from the parallaxes of longitude and latitude, without which the calculation of ſolar eclipſes would be the ſame with that of lunar ones.

Aſtronomy of lunar ECLIPSES. Theſe being occaſioned by the immerſion of the moon into the earth's ſhadow, all that we have to do, in order to delineate a lunar eclipſe, is to calculate the apparent ſemi-diameter of the earth's ſhadow at the moon. Thus, let A B (plate LXXXIII. n° 6.) repreſent the earth, T its center, A E B its conical ſhadow, D C the diameter of a ſection thereof at the moon; and drawing D T, we have the outward angle $ADT = DTE + DET$; ſo that $DTE = ADT - DET$; that is, the angle D T E, under which the ſemi-diameter of the earth's ſhadow appears at the diſtance of the moon, is equal to the difference between the moon's horizontal parallax A D T, and the ſemi-diameter of the ſun D E T. If, therefore, A E, (*ibid.* n° 4.) repreſent the path of the earth's ſhadow at the diſtance of the moon near the node ☊, and F H a part of the lunar orbit, and the ſection of the earth's ſhadow be delineated at ☊, B, C, D; and the full moon at ☊, I, N, G; then it is evident there can be no eclipſe of the moon, where the leaſt diſtance of the centers of the moon and ſhadow exceeds the ſum of their ſemi-diameters, as at D. But where this diſtance is leſs, the moon muſt be eclipſed either in part or wholly as at B and ☊; in which latter caſe the moon paſſes over the diameter of the ſhadow. But in a certain poſition of the ſhadow, as at C, the leaſt diſtance of the centers N C, is equal to the ſum of the ſemi-diameters; and conſequently ☊ C is the ecliptic limit for lunar eclipſes: to find which, we have this analogy, as the ſine of the angle N ☊ C $= 5°$ (the inclination of the moon's orbit to the plane of the ecliptic) is to the radius, ſo is the logarithm of the ſide N C$= 63' 12''$ to the logarithm of the ſide ☊ C $= 12° 5' =$ the ecliptic limit. Hence, if the moon be at a leſs diſtance from the node ☊ than 12° 5′, there will be an eclipſe; otherwiſe none can happen.

If the earth had no atmoſphere, the ſhadow would be abſolutely dark, and the moon involved in it quite inviſible; but, by means of the atmoſphere, many of the ſolar rays are refracted into, and mixed with the ſhadow, whereby the moon is rendered viſible in the midſt of it, and of a duſky red colour.

For calculating eclipſes of the moon, the following data are neceſſary: 1. Her true diſtance from the node, at the mean conjunction. 2. The true time of the oppoſition, together with the true place of the ſun and moon, reduced to the ecliptic. 3. The moon's true latitude, at the time of the true conjunction, and the diſtance of the luminaries from the earth: alſo their horizontal parallaxes, and apparent ſemi-diameters. 4. The true horary motions of the moon and ſun, and the apparent ſemi-diameter of the earth's ſhadow. With theſe data it is eaſy to find the duration, beginning, middle, and quantity of eclipſes.

ECLIPSES *of Jupiter's ſatellites.* See the articles SATELLITE and JUPITER.

ECLIPTIC, in aſtronomy, a great circle of the ſphere, ſuppoſed to be drawn thro' the middle of the zodiac, making an angle with the equinoctial of about 23° 30′, which is the ſun's greateſt declination: or, more ſtrictly ſpeaking, it is that path or way among the fixed ſtars, that the earth appears to deſcribe, to an eye placed in the ſun.

Some call it *via ſolis*, the way of the ſun, becauſe the ſun, in his apparent annual motion, never deviates from it, though all the planets do, more or leſs. See the articles GLOBE and ZODIAC.

It is called ecliptic, by reaſon all eclipſes happen when the planets are in or near its nodes. See the article NODE.

The axis of the ecliptic is a right line ſuppoſed to paſs through the center of the ſun, and to be perpendicular to the plane of the ecliptic; and the points in the heavens, to which this axis points, are called the poles thereof; and the great circles, paſſing through theſe poles, will be perpendicular to its plane, and therefore are called its ſecondaries, and ſometimes circles of longitude.

As to the obliquity of the ecliptic, or angle which its plane makes with that of the equinoctial, it is found to vary; the mean obliquity being found, by Dr. Bradley to be 23° 28′ 30″, who ſuppoſes this variation may be owing to a nutation of the earth's axis, or to a gradual approach of the ecliptic to the equinoctial, at about the rate of 1′ in 100 years.

ECLIPTIC, in geography, a great circle on the terreſtrial globe, not only anſwering to, but falling within the plane of the celeſtial ecliptic. See GLOBE.

ECLOGUE, εκλογη, in poetry, a kind of paſtoral compoſition, or a ſmall elegant poem, in a natural ſimple ſtyle. See the article PASTORAL.

The eclogue, in its primary intention, is the ſame thing with the idyllium, but cuſtom has made ſome difference between them, and appropriated the name eclogue to pieces wherein ſhepherds are introduced, and idyllium to thoſe written like eclogues, but without any ſhepherds in them. The eclogue then is properly an image of paſtoral life, upon which account the matter is low, and its genius humble. Its buſineſs is to deſcribe the loves, ſports, piques, jealouſies, intrigues, and other adventures of ſhepherds; ſo that its character muſt be ſimple, the wit eaſy, and the expreſſion familiar. Then the true character of the eclogue is ſimplicity and modeſty; its figures are neat, the paſſions tender, the motions eaſy, and though ſometimes it may have little tranſports, and deſpairs, yet it never riſes ſo high as to be fierce or violent. Its narrations are ſhort, deſcriptions little, the thoughts ingenious, the manners innocent, the language pure, the verſe flowing, the expreſſions plain, and all the diſcourſe natural.

The models in this ſort of poetry are Theocritus and Virgil, who both have ſome eclogues of a lofty character. The eclogue therefore occaſionally raiſes its voice; yet M. Fontenelle blames ſome modern poets for having made matters of high concern the ſubject of ſome of their eclogues, and cauſed their ſhepherds ſing the praiſes of kings and heroes. The Italians are thought faulty in this reſpect, for aiming generally to be too witty or ſuperbe in their ſtyle: however, ſince the eſtabliſhment of the Academy of Arcadians at Rome, the taſte for eclogues has been greatly improved amongſt them. Some imagine the name eclogue to have been originally applied to ſuch poems as were wrote in imitation of others: ſuch are the Eclogues of Virgil, which are only imitations of Theocritus.

ECLOGUE is alſo applied to certain compoſitions in proſe: ſuch are thoſe of Strabo, Diodorus, *&c.* in which ſenſe, the word ſignifies only an extract, or collection.

ECOUTÉ, in the manege, a pace or motion of a horſe, when he rides well upon the hands and the heels, is compactly put upon his haunches, and hears or liſtens to the heels or ſpurs, and continues duly balanced between the heels, without throwing to either ſide. This happens when a horſe has a fine ſenſe of the aids of the hand and heel.

ECPHORA, in architecture, commonly ſignifies the diſtance between the extremity of a member or moulding, and the naked of the column, or any other part it projects from.

Some authors, however, account for the ecphora from the axis of the column, and define it to be the right line intercepted between the axis and the outermoſt ſurface of a member or moulding.

ECPHRACTICS, in medicine, remedies which attenuate and remove obſtructions. See the articles ATTENUANTS and DEOBSTRUENTS.

ECPIESMA, in ſurgery, a ſort of fracture of the cranium, when the bones are much ſhattered, and, preſſing inwardly, affect the membranes of the brain.

ECPIESMA, in pharmacy, ſignifies the maſs remaining after the juices of vegetables have been preſſed out: and, in this ſenſe, is the ſame as magma. It ſometimes further imports the juice preſſed out.

ECPIESMUS, εκπιεσμος, in the antient writers of medicine, a word uſed to expreſs a diſtemperature of the eye, conſiſting in a very great prominence of the entire globe of the eye, which is, as it were, thruſt out of its ſocket or orbit, by a great flux of humours, or an inflammation.

ECSTATICI, εκϛατικοι, in grecian antiquity, a ſort of diviners, who were caſt into trances or ecſtaſies, in which they lay like dead men, or perſons aſleep, deprived of all ſenſe or motion, but after ſome time (it may be days, or months, or years, for Epimenides the Cretan is reported to have lain in this poſture ſeventy-five years) returning to themſelves, gave ſtrange relations of what they had ſeen and heard.

ECTASIS, in grammar, the ſame with diaſtole. See the article DIASTOLE.

ECTHESIS, in church-hiſtory, a confeſſion of faith, in the form of an edict, publiſhed in the year 649, by the emperor Heraclius, with a view to pacify the troubles occaſioned by the eutychian hereſy in the eaſtern church. However, the ſame prince revoked it, on being informed that pope Severinus had condemned it, as favouring the monothelites; declaring at the ſame time, that Sergius, patriarch of Conſtantinople, was the author of it. See the article TYPE *of Conſtance*.

ECTHLIPSIS, εκθλιψις, among latin grammarians, a figure of proſody whereby the *m* at the end of a word, when the following word begins with a vowel, is elided, or cut off, together with the vowel preceding it, for the ſake of the meaſure of the verſe: thus they read *mult' ille*, for *multum ille*.

The reaſon of an ecthlipſis, which in latin verſe ought always to take place when the immediately following word begins with a vowel, is to prevent the harſhneſs of an hiatus, or concourſe of vowels.

ECTROPIUM, in ſurgery, is when the eye-lids are inverted, or retracted, ſo as to ſhew their internal or red ſurface, and cannot ſufficiently cover the eye. Sometimes this is a ſimple or original diſorder, and ſometimes only a ſymptom, or conſequence of another, as an inflammation, ſarcoma, tumour, *&c.* When the diſorder is ſimple, or original, it generally ariſes from a contraction of the ſkin of the eye-lid, by the ſcar of a wound, ulcer, burn, *&c.* or from an induration and contraction of the ſkin after an inflammation; and ſometimes it may proceed, in a great meaſure, from the uſe of aſtringent collyria injudiciouſly applied, in diſorders of the eyes.

The cure of this diſorder conſiſts in elongating, or relaxing, the external ſkin of the eye-lid ſo as to cover the eye. When the diſorder is recent, it will be beſt to try the application of emollients, ſuch as the vapours of hot milk or water, oil of almonds, or olives, mucilage of quince-ſeeds, hare's foot, ung. dialthææ, *&c.* to be continued for ſeveral days on the ſcar, or contracted ſkin of the eye-lid, which muſt be often extended, either upwards or downwards, according as the diſorder is in the upper or lower lid. And every night, when the patient goes to bed, it will be proper to bring the eye-lids cloſe to each other, and to reſtrain them cloſe by plaſter, compreſs, and bandage, to be renewed every night. If none of theſe means take effect, it will be proper firſt to make a ſemilunar inciſion in the external ſkin of the eye-lid, next its tarſus; making the angles of the inciſion downwards in the upper lid, and upward in the lower lid, that the ſkin may be elongated. If the ſkin does not appear to be let out enough by one inciſion, two or three more muſt be made, running parallel to the firſt, and about the diſtance of a ſmall packthread from each other, and when the eye-lid is thus ſufficiently elongated, the inciſions muſt firſt be ſtuffed with dry lint, and then with lint armed with vulnerary ungent; and laſtly, a piece of ſticking plaſter ſhould be faſtened to the margin of the eye-lid, to keep it extended either up or down; which method ſhould be continued till the eye-lids ſhut cloſe.

When the diſorder ariſes from an inflammation, or fleſhy excreſcence within the eye-lid, the inflammation muſt be removed, and arming the eye with a defenſitive plate, the excreſcence muſt be removed by lapis infernalis. When the ſkin of the eye-lid has continued violently diſtorted from the patient's birth, there are ſeldom any hopes of curing it.

ECTYLOTICS, in pharmacy, remedies proper for conſuming calloſities. See the article CALLUS.

ECTYPE, εκτυπον, among antiquarians, an impreſſion of a medal, ſeal, or ring, or a figured copy of an inſcription, or other antient monument.

ECU, or ESCU, a french crown, for the value of which ſee the article COIN.

ECUSSON, in heraldry, a little eſcutcheon. See the article ESCUTCHEON.

EDDISH, or EADISH, the latter paſture, or graſs that comes after mowing, or reaping; otherwiſe called eagraſs, earſh, and etch.

EDDY-TIDE, or EDDY-WATER, among ſeamen, is where the water runs back contrary to the tide; or that which hinders the free paſſage of the ſtream, and ſo cauſes it to return again.

EDDY-WIND is that which returns, or is beat back from a ſail, mountain, or any thing that may hinder its paſſage.

EDGE, in general, denotes the ſide or border of a thing; but is more particularly uſed for the ſharp ſide of ſome weapon, inſtrument, or tool: thus we ſay, the edge of a ſword, knife, chiſſel, *&c.* In the ſea-language, a ſhip is ſaid to edge in with another, when making up to it.

EDGINGS, among gardeners, the ſeries of ſmall but durable plants, ſet round the edges or borders of flower-beds, *&c.*

The beſt and moſt durable plants for this uſe is box, which, if well planted, and rightly managed, will continue in ſtrength and beauty for many years. The ſeaſons for planting theſe are the autumn and very early in the ſpring; and the beſt ſpecies for this purpoſe is the dwarf dutch box. The edgings of box are now only planted ed on the ſides of borders next walls, and not, as was ſome time ſince the faſhion, all round borders, or fruit-beds, in the middle of gardens, unleſs they have a gravel-walk between them, in which caſe it ſerves to keep the earth of the borders from waſhing down on the walks in hard rains, and fouling the gravel. Daiſies, thrift, or ſea-july-flowers, and chamomile are alſo uſed, by ſome, for this purpoſe; but they grow out of form, and require yearly tranſplanting.

EDICT, *edictum*, in matters of polity, an order or inſtrument, ſigned and ſealed by a prince, to ſerve as a law to his ſubjects.

We find frequent mention of the edicts of the prætor, the ordinances of that officer in the roman law. In the french law, the edicts are of ſeveral kinds; ſome importing a new law or regulation; others, the erection of new offices; eſtabliſhments of duties, rents, *&c.* and ſometimes articles of pacification. In France edicts are much the ſame as a proclamation is with us, but with this difference, that the former have the authority of a law in themſelves, from the power which iſſues them forth; whereas the latter are only declarations of a law, to which they refer, and have no power in themſelves.

Edicts can have no room in Britain, becauſe that the enacting of laws is lodged in the parliament, and not in the king.

Edicts are all ſealed with green-wax, to ſhew that they are perpetual and irrevocable.

EDIFICE, the ſame with building. See the article BUILDING.

EDILE, or ÆDILE. See ÆDILE.

EDINBURGH, the capital city of Scotland, ſituated about one mile ſouth of Leith and of the frith of Forth, eighty-two miles north weſt of Newcaſtle, and about four hundred north weſt of London: weſt long. 3°, and north lat. 56°. Here the parliament of that antient kingdom uſed to aſſemble, before its union with England; and here the ſupreme courts of juſtice for North Britain are ſtill held. It has likewiſe a celebrated univerſity, and exceeds all the cities of the world, for the loftineſs of its buildings, which are all of hewn ſtone, ſaſhed, and ten, eleven, or more ſtories high: it is alſo remarkable for the ſpaciouſneſs of its High-ſtreet, its Caſtle, the palace of Holyrood-houſe, *&c.*

EDITOR, a perſon of learning, who has the care of an impreſſion of any work, particularly that of an antient author: thus Eraſmus was a great editor; the louvain doctors, Scaliger, Petavius, F. Sirmond, biſhop Walton, Mr. Hearne, Mr. Ruddiman, *&c.* are likewiſe famous editors.

EDMOND'S BURY. See BURY.

EDUCATION, the inſtructing children, and youth in general, in ſuch branches of knowledge and polite exerciſes, as are ſuitable to their genius and ſtation.

Education is a very extenſive ſubject, that has employed the thoughts and pens of the greateſt men: Locke, the archbiſhop of Cambray, Tanaquil Faber, Mr. Crouſaz, and Rollin may be conſulted on this head.

The principal aim of parents ſhould be, to know what ſphere of life their children are deſigned to act in; what education is really ſuitable for them; what will be the conſequence of neglecting that; and what chance a ſuperior education will give them, for their advancement in the world. Their chief ſtudy ſhould be to give their children ſuch a degree of knowledge, as will qualify them to fill ſome certain poſt or ſtation in life: in ſhort, to fit them for an employment ſuited to their condition and capacity, ſuch as will make them happy in themſelves, and uſeful to ſociety.

The education of a nobleman ſhould contain every thing that is both uſeful and ornamental. Next to languages, he ought to be inſtructed in philoſophy and hiſtory, particularly the hiſtory of his own nation. He ſhould alſo be made acquainted with the cuſtoms, laws, and manners of different ſtates, but more eſpecially with the conſtitution of his own country. To this ſolid learning ſhould be added the embelliſhment of polite literature, poetry, painting, and muſic; and, to complete the education, dancing, fencing, riding, and architecture.

As to the education of gentlemen, the plan above laid down will in general hold good. Every gentleman of fortune ſhould certainly give all his ſons the education of gentlemen; but the eldeſt ought to be graced with every ornament. Parents of this claſs, beſides carefully attending to the genius, temper, and inclinations of their younger ſons, ſhould reſolve on an employment ſuited to them; which being ſettled, they are to purſue their education accordingly. The three learned profeſſions, divinity, law, and phyſic, require each a ſpecies of learning proper to itſelf. But beſides theſe, the ſea, the army, and the exchange, with many other genteel employments, are open for them to engage in: and hence appears not only the neceſſity of conſidering their fortune, but attending to their genius, temper and inclinations.

As many among the mercantile claſs are deſcended of the beſt gentlemen's families, and as intermarriages are frequent between them, it is highly proper that their children ſhould be genteelly educated. However, even in this, regard ſhould be had to their own fortune, and the real proſpects before them: for nothing can be a greater misfortune than to educate a boy like a fine gentleman, and not be able to ſupport it. A learned education is needleſs, in the caſe before us; but reading, writing, arithmetic, geography, and drawing, are extremely proper, or rather abſolutely neceſſary.

With regard to manners, the quality ſhould be cautioned never to ſink beneath their rank; and while they learn to be humble, they muſt carefully avoid being mean. The gentry ſhould approach as near to the quality in good behaviour, and politeneſs, as poſſible: and as to the trading part of the people, they ſhould be taught that every thing coarſe, vulgar, and mean is highly unbecoming them; is not only abuſing the faculties providence has furniſhed them with, but is debaſing their nature.

Before we conclude this article, it will be proper to take notice of the impropriety and inconvenience of not teaching young people to think and act of themſelves. The art of a governor, and the leſſons of a preceptor, change a child into a youth; they infuſe into him a greater ſhare of knowledge than he could be naturally ſuppoſed to have at his age. But this very child, when he arrives to that ſtage of life in which he muſt think, ſpeak, and act of himſelf, is ſtripped all of a ſudden of his premature merit. His ſummer is far from anſwering the fine bloſſoms of his ſpring. The too ſolicitous education he has received, becomes rather prejudicial to him, by reaſon of its being the occaſion of his falling into the dangerous habit of letting other people think for him. His mind has contracted an internal lazineſs, which makes him wait for external impulſes to reſolve and to act. The mind contracts a lazineſs with as much facility as the legs and feet. A man who never ſtirs without the aſſiſtance of ſome vehicle, becomes ſoon incapable of the ſame free uſe of his legs, as a perſon that has been conſtantly accuſtomed to walk. As, therefore, we muſt lend a hand to the one when he walks, ſo we muſt help the other to think, and even to will: whereas in a child bred up with leſs care, his inward part labours of itſelf, and his mind grows active. He learns to reaſon and determine of himſelf, in the ſame manner as other things are learned. At length he attains to argue and reſolve rightly, by mere dint of reaſoning and reflecting on the cauſe of his deception, when the events convince him of the error of his judgment.

EDULCORATION, in pharmacy, the ſame with dulcifying. See the article Dulcifying.

Edulcoration, in chemiſtry, the ſeparating, by a waſhing, or ſolution, in water, the ſalt that any body may be impregnated with, or thoſe that may be left adhering to a body, after any operation. See the article Ablution.

The ſolution here ſpoke of, is in metals only, and is properly a kind of moiſt one, the ſaline parts adhering to bodies not ſoluble in water, being by that menſtruum taken up, and eaten off from the body, and the ſolution afterwards ſeparated from the remaining ſolid, either by ſubſidence or filtration. See the article Filtration.

It is proper in this operation to enlarge the ſurface of the body to be edulcorated, by pounding it in a mortar, that the ſolution may have the ſpeedier ſucceſs; and for this purpoſe it ſhould always be kept ſtirring with a ſtick, while the water is on it, that all the parts of the body to be edulcorated, which otherwiſe would ſome of them ſink to the bottom, may be made equally, at one time or other, contiguous to the particles of the edulcorating fluid, by which all the ſolutions are greatly facilitated. Boiling water is, in ſome caſes, requiſite; for the heat of that, by the inward motion and rarefaction it occaſions, promotes in an extraordinary manner ſaline ſolutions. Very frequent repetitions of this operation are neceſſary; and, after all, a nice experiment will always find ſome ſmall portion of ſalts remaining.

EEL, *anguilla*, in ichthyology, a ſpecies of muræna. See Muræna.

The common eel is the ſimple coloured muræna, with the lower jaw longeſt: it has three fins, *viz.* two pectoral ones, ſtanding one on each ſide; and a ſingle low back-fin, which beginning at ſome

diſtanc

diſtance from the head, runs along the back to the tail, and comes up again continuous as far as the anus: the extremity of this fin, which forms what may be called the tail, is neither round nor ſquare, but ſubacute. See plate LXXXV. fig. 1.

It is common in all our freſh waters, ponds, ditches, and rivers; and its general ſtandard is about two feet in length, though ſome are often caught much larger.

The fat of eels is accounted vulnerary, and good in an alopecia, caſes of deafneſs, and the hæmorrhoids.

Eel-fiſhing is of divers kinds, as ſniggling, bobbing, &c. See Fishing.

The ſilver-eel may be catched with ſeveral ſorts of baits, as powdered beef, lobs, or garden-worms, minnows, hens guts, fiſh-garbage, &c. The moſt proper time for taking them is in the night, faſtening your line to the bank-ſides, with your laying-hook in the water: or a line may be thrown with good ſtore of hooks, baited and plummed, with a float to diſcover where the line lies, that they may be taken up in the morning.

Microſcopic **Eels**, thoſe diſcovered by the microſcope in pepper-water and other infuſions of plants, as well as in the ſeed of moſt animals. See Animalcule.

They are otherwiſe called capillary eels, or enchelides. See Enchelides.

Sea-**Eel**, *anguilla marina*, a fiſh otherwiſe called conger; being a ſpecies of muræna, with the upper edge of the back-fin black. See the articles Conger and Muræna.

Eel-backed, an appellation given to ſuch horſes as have black liſts along their back.

Eel-pout, the engliſh name of a fiſh of the gadus-kind, with three fins on the back, cirri at the mouth, and the two jaws equal: the generality of authors call it muſtela fluviatilis. See Gadus.

Eel spear, a forked inſtrument with three or four jagged teeth, uſed for catching of eels: that with the four teeth is beſt, which they ſtrike into the mud at the bottom of the river, and if it ſtrike againſt any ells, it never fails to bring them up.

EFFARE′, or **Effraye′**, in heraldry, a term applied to a beaſt rearing on its hind legs, as if it were frighted or provoked.

EFFECT, in a general ſenſe, is that which reſults from, or is produced by, any cauſe. See the article Cause.

Effects, in commerce, law, &c. the goods poſſeſſed by any perſon, whether moveable or immoveable. See Chattels.

Effects, in the manege, the motions of the hand that ſerve to conduct the horſe. See the article Aids.

There are four effects of the hand, or four ways of making uſe of the bridle, *viz.* to puſh a horſe forwards, to give him head, to hold him in, and to turn the hand either to the right or left.

EFFECTIONS, in geometry, are uſed in the ſame ſenſe with the geometrical conſtruction of propoſitions, and often of problems and practices, which, when they are deducible from, or founded upon, ſome general propoſition, are called the geometrical effections thereunto belonging.

EFFERVESCENCE, in a general ſenſe, ſignifies a ſlight degree of ebullition in liquors expoſed to a due degree of heat: but the chemiſts apply it to that inteſtine motion excited in various fluids, either by the mixture of fluids with others of a different nature; or by dropping ſalts, or powders, of various kinds into fluids.

The two moſt common oppoſites, acids and alkalies, on being mixed, cauſe a great ebullition, or frothing, but no great heat: but the ſolution of ſome metals in aquafortis, cauſe intenſe heat, and emit flame. The mixing aromatic oils with acid mineral ſpirits, actually kindle and burn with violent exploſions; and ſome vegetable ſubſtances, putrifying with moiſture, will, ſometimes, heat ſo as to kindle whatever lies dry about that part of the heap where the putrefaction happens.

Hence, efferveſcences are diſtinguiſhed into hot and cold; that which produces heat in the ſubſtances ſo mixt, is called a hot efferveſcence, but if no heat is excited, it is called a cold efferveſcence. Among the mixtures that excite a cold efferveſcence, is that of powdered coral mixt with diſtilled vinegar; which is accounted for hence, by Chauvin, that the pores of the coral being very great, it may be eaſily diſſolved in the acid ſpirit, without any great friction, or colliſion of the parts, ſuch as would be neceſſary to generate any conſiderable heat.

The principal bodies in which efferveſcences happen, according to Boerhaave, are, 1. Native vegetable acids, as moſt juices of trees, ſhrubs, and plants that run in the ſpring; moſt juices of unripe ſummer fruits; particular juices, remaining acid when ripe, as of oranges, citrons, lemons, tamarinds, ſorrel, wood-ſorrel; fermented acid vegetables, as the meals when they turn ſour; rheniſh and Moſelle wine, and tartar vegetables twice fermented; native and diſtilled vinegars; the acids of animals from tartiſh or acid vegetable aliment, as in the chyle, ſour milk, whey, butter-milk. 2. The native acids of foſſils; as the acid of ſulphur, alum or vitriol; or thoſe acids as they lye concealed in ſulphur, or vitriol ſtones; or as thence extracted by a violent fire; or a ſtronger acid, as in the ſpirit of nitre, ſalt, alum, vitriol, and ſulphur. 3. True fixed alkalies, made of any vegetable matter, by burning the more volatile alkalies, whether ſpontaneous, as in garlic, onions, ſcurvy-graſs, muſtard, *&c.* produced by putrefaction from animal or vegetable ſubjects, or procured from the ſame by diſtillation and burning. 4. Certain bodies improperly called alkalies, only on account of agreeing therewith in fermenting with acids: theſe are almoſt all the boles, bones, chalk, clays, coral, crab-eyes, earths, horns, hoofs, nails, pearls, ſhells, ſtones and teeth. 5. The ſeven metals. 6. The ſemi-metals; antimony, biſmuth, lapis calaminaris, lapis hæmatites, lime, *&c.*

Hence we have four general rules, *viz.* 1. The bodies of the firſt claſs conſtantly make an effervеſcence with thoſe of the ſecond and third, either ſooner or later, more or leſs; or as they are weak or ſtrong. The effervеſcence continues till the point of ſaturation is gained, then ceaſes, and the acrimony, after a full ſaturation, is generally ſoftened. 2. The bodies of the firſt claſs make an effervеſcence with thoſe of the fourth, and at the end of the ſaturation, vitriols are uſually produced. 3. The bodies of the firſt claſs act in the ſame manner with thoſe of the fifth. 4. The bodies of the ſecond, third, fourth, and fifth claſſes, being mixed together, are ſcarce found to make any effervеſcence.

EFFERVESCENCE, in vintage, a term appropriated by Portzius and others, to ſignify that working of wine which is by ſome improperly called fermentation, thereby confounding two very different things. See the article FERMENTATION.

EFFICACIOUS, a term uſed by divines, in ſpeaking of grace; importing ſuch grace, as never fails to produce its effect.

EFFICIENT CAUSE. See CAUSE.

EFFICIENTS, in arithmetic, the ſame with factors. See FACTOR.

EFFIGY, *effigies*, the portrait, figure, or exact repreſentation of a perſon.

EFFLORESCENCE, among phyſicians, the ſame with exanthema. See the article EXANTHEMA.

EFFLUENT FEVER, the ſame with an inflammatory one. See the article INFLAMMATORY.

EFFLUVIUM, in phyſiology, a term much uſed by philoſophers and phyſicians, to expreſs the minute particles, which exhale from moſt, if not all, terreſtrial bodies in form of inſenſible vapours. See the articles VAPOUR and EXHALATION.

Sometimes indeed, theſe effluvia become viſible, and are ſeen aſcending in form of ſmoak; conſtituting what, in animals and plants, makes the matter of perſpiration. See PERSPIRATION.

Nothing can exceed the ſubtility of the odoriferous effluvia of plants, and other bodies. Mr. Boyle tells us, that having expoſed to the open air a certain quantity of aſa foetida, he found its weight diminiſhed only the eighth part of a grain in ſix days: hence, if we ſuppoſe, that during all that time a man could ſmell the aſa foetida at the diſtance of five feet, it will appear that its effluvia cannot exceed the $\frac{1}{26250000000000000}$ part of an inch in magnitude.

The effluvia of mineral ſubſtances are called ſteams; and when collected in mines, or other cloſe places, damps. See the article DAMPS.

Malignant effluvia are aſſigned by phyſicians, as the cauſe of the plague, and other contagious diſeaſes; as the jail-diſtemper, hoſpital fever, and the like. See PLAGUE and HOSPITAL FEVER.

Effluvia iſſuing from corrupted ſubſtances, according to the ingenious Dr. Pringle, chiefly conſiſt of the phlogiſton or ſulphur-principle, only combined with the ſaline parts of the body: for this principle, when ſingle, is perhaps imperceptible to our ſenſe of ſmelling; and, when diveſted of theſe ſalts, is never peſtilential: ſo that the deleterious effluvia of rotten ſubſtances ſeem to conſiſt of a certain combination of the ſulphureous with the ſaline principle, which united, not only become the moſt irritating ſtimuli to the nerves, but act upon the humours as a putrid ferment, in promoting their corruption.

EFFUSION, in a general ſenſe, the pouring

ing out of any thing liquid, and that with ſome violence.

EFFUSION, in aſtronomy, part of the ſign aquarius. See AQUARIUS.

EFT, in zoology, the engliſh name of the common lizard, lacertus vulgaris, called alſo, in ſeveral parts of the kingdom, the newt and ſwift. See the article LIZARD.

EGG, *ovum*, in phyſiology, a body formed in certain females, in which is contained an embryo, or fœtus of the ſame ſpecies, under a cortical ſurface, or ſhell. The exterior part of an egg is the ſhell, which is in a hen, for inſtance, a white, thin, and friable cortex, including all the other parts. The ſhell becomes more brittle by being expoſed to a dry heat. It is lined every where with a very thin, but pretty tough membrane, which, dividing at, or very near, the obtuſe end of the egg, forms a ſmall bag, where only air is contained. In new-laid eggs this folliculus appears very little, but becomes larger when the egg is kept.

Within this are contained the albumen, or white, and the vitellus, or yolk; each of which have their different virtues. See ALBUMEN and VITELLUS.

The albumen is a cold, viſcuous, white liquor in the egg, differing in conſiſtence, in its different parts. It is obſerved, that there are two diſtinct albumens, each of which are incloſed in its proper membrane; of theſe, one is very thin and liquid, and the other more denſe and viſcuous, and of a ſomewhat whiter colour, but, in old and ſtale eggs, after ſome days incubation, inclining to a yellow. As this ſecond albumen covers the yolk on all ſides, ſo it is itſelf ſurrounded by the other external liquid. The albumen of a fecundated egg, is as ſweet and free from corruption, during all the time of incubation, as it is in new laid eggs; as is alſo the vitellus. As the eggs of hens conſiſt of two liquors ſeparated one from another, and diſtinguiſhed by two branches of umbilical veins, one of which goes to the vitellus, and the other to the albumen, ſo it is very probable that they are of different natures, and conſequently appointed for different purpoſes. Ariſtotle ſays, that the vitellus is condenſed by cold, but the albumen rather liquified. On the contrary, the albumen is condenſed by fire; the vitellus retains its ſoftneſs, if it be not burnt, and concretes more in boiling than in roaſting. When the vitellus grows warm with incubation, it becomes more humid, and like melting wax, or fat; whence it takes up more ſpace, for as the fœtus increaſes, the albumen inſenſibly waſtes away, and condenſes: the vitellus, on the contrary, ſeems to loſe little or nothing of its bulk, when the fœtus is perfected, and only appears more liquid and humid, when the abdomen of the fœtus begins to be formed.

The chick in the egg is firſt nouriſhed by the albumen; and when this is conſumed, by the vitellus, as with milk. If we compare the chalazæ to the extremities of an axis, paſſing through the vitellus, which is of a ſpherical form, this ſphere will be compoſed of two unequal portions, its axis not paſſing through its center; conſequently, ſince it is heavier than the white, its ſmaller portion muſt always be uppermoſt, in all poſitions of the egg. See the article CHALAZA.

The yellowiſh-white, round ſpot, called cicatricula, is placed on the middle of the ſmaller portion of the yolk, and therefore, from what has been ſaid in the laſt paragraph, muſt always appear on the ſuperior part of the vitellus. See the article CICATRICULA.

Not long before the excluſion of the chick, the whole yolk is taken into its abdomen; and the ſhell, at the obtuſe end of the egg, frequently appears cracked, ſome time before the excluſion of the chick. The chick is ſometimes obſerved to perforate the ſhell with its beak. After excluſion, the yolk is gradually waſted, being conveyed into the ſmall guts by a ſmall duct. Ariſtotle ſays, that long eggs produce the female, and round the male kind: Scaliger ſeems to be of the ſame opinion. Pliny is of the oppoſite ſide, for he pretends, that the long eggs are for the males, and the round for the females: but theſe opinions are ſupported by no foundation, as the authors give neither good reaſon nor experiments to prove their reſpective aſſertions, and it is very likely that both the round and the long eggs may indifferently produce male and female.

Eggs differ very much according to the birds that lay them, according to their colour, form, bigneſs, age, and the different way of dreſſing them: thoſe moſt uſed in food, are hens eggs: of theſe, ſuch as are new laid are beſt. Galen ſays, that the beſt and wholeſomeſt eggs are thoſe of the hen and pheaſant, but he diſallows the uſe of thoſe of the gooſe and the oſtrich. Eggs ſhould be moderately done: ſome authors alſo require, that they ſhould be very white and long. Eggs are nouriſhing and good food, they increaſe the ſeminal juices, qualify the ſharp humours of the breaſt, are good for phthiſical people, eaſily digeſt, eaſe the piles, and are looked upon to be good to make the voice loud and fine. When eggs are too old, they heat too much, produce bad juice, and are more eſpecially noxious to thoſe who are of a hot and bilious conſtitution: they contain much oil and ſalt, and agree at all times with any age and conſtitution, provided they are endued with the good qualities before-mentioned.

Aquapendente relates ſeveral ways how to know whether eggs are new laid or not; he would have them held to a candle, and then ſee whether the humours contained therein are clear, thin and tranſparent; for if they be otherwiſe, it is a ſign the eggs are old, becauſe the effervescence has embroiled and confounded the inſenſible parts of theſe humours, and made them dark. Laſtly, hold an egg to the fire, and if a little watry moiſture ſticks to it, it is new; if not, it is old; becauſe a new laid egg is moiſter than the old, and its humours being thinner, work eaſier through the pores of the ſhell.

As to the preſervation of eggs, it is obſerved that the egg is always quite full when it is firſt laid by the hen, but from that time it gradually becomes leſs and leſs ſo, to its decay; and however compact and cloſe its ſhell may appear, it is nevertheleſs perforated with a multitude of ſmall holes, though too minute for the diſcernment of our eyes, the effect of which is a daily decreaſe of matter within the egg, from the time of its being laid; and the perſpiration is much quicker in hot weather than in cold.

To preſerve the egg freſh, there needs no more than to preſerve it full, and ſtop its tranſpiration; the method of doing which, is, by ſtopping up thoſe pores with matter which is not ſoluble in watry fluids; and on this principle it is, that all kinds of varniſh, prepared with ſpirit of wine, will preſerve eggs freſh for a long time, if they are carefully rubbed all over the ſhell: tallow, or mutton fat, is alſo good for this purpoſe, for ſuch as are rubbed over with this will keep as long as thoſe coated over with varniſh.

It was antiently thought, that none but birds and fiſhes, with ſome other animals, were produced *ab ovo*, from the egg, but many of the moderns incline to think that all animals, even man himſelf, is generated that way. In the teſtes of women, are found little veſicles, about the ſize of green peaſe, which are accounted eggs; for which reaſon, theſe parts which the antients called teſticles, the moderns call ovaries: theſe eggs, fecundated by the volatile and ſpirituous part of the ſeed of the male, are detached from the ovary, and fall down the fallopian tubes into the uterus, where they grow and increaſe. This ſyſtem is countenanced by abundance of obſervations and experiments. See the article GENERATION.

Artificial method of hatching EGGS. See the article HATCHING.

Other eggs, improperly ſo called, are the white oblong bodies whereof inſects are formed: ſuch are the eggs of flies, gnats, butterflies, &c. which the antients called *vermiculi*. The female fly, after a congreſs with the male, is ſeldom ſo much as twenty-four hours before ſhe begins to depoſit her eggs upon ſome ſubſtance proper to give nouriſhment to the worms that are to be produced from them: theſe eggs in general are white and oblong. The gnat arranges her eggs in the form of a ſmall boat; each ſeparate egg is of the form of a ninepin; the thicker end of theſe are placed downwards, and are all firmly joined to one another by their middles.

EGG, in architecture, an ornament in that form, cut in the echinus, or quarter round of the ionic and compoſite capitals. The profile or contour of the echinus is enriched with eggs and anchors placed alternately.

EGRA, a city of Bohemia, ſituated on a river of the ſame name, about ſeventy-five miles weſt of Prague: eaſt longitude 12° 22′, north latitude 50° 10′.

It is remarkable for its medicinal waters, eſteemed good in hypochondriacal caſes, and other diſeaſes ariſing from infarctions of the bowels. They are gently cathartic, and afford a ſalt of the ſame mixture with our Epſom-ſalt, much uſed in Germany, and called from the name of the place Egranum Sal.

EGYPT, an extenſive country of Africa, lying between 30° and 36° of eaſt longitude, and between 21° and 31° of north latitude, and bounded by the Mediterranean on the north; by the Red-ſea and

Iſthmus of Suez, which divide it from Arabia, on the eaſt; by Abyſſinia or Ethiopia, on the ſouth; and by the deſarts of Barca and Nubia, on the weſt; being ſix hundred miles in length from north to ſouth; and from one hundred to two hundred in breadth from eaſt to weſt. Egypt is ſubject to the grand ſignior, and governed by a baſhaw, or viceroy. It owes its fertility to the annual overflowing of the Nile, which it begins to do in the months of May and June, and is uſually at its height in September, from which time the waters decreaſe till May or June again. By this ſupply of water, Egypt is rendered ſo fruitful, as to ſerve Conſtantinople, and other places with corn, as it did Rome and Italy of old. They only harrow their grain into the mud, on the retiring of the water, and in March following, uſually have a plentiful harveſt; and the lands, not ſown, yield good crops of graſs for the uſe of the cattle. According to Mr. Sandys, no country in the world is better furniſhed with grain, fleſh, fiſh, ſugar, fruits, melons, roots, and other garden ſtuff, than the lower Egypt.

EGYPTIANS, or GYPSIES. See GYPSIES.

EJACULATION, in medicine, is the introduction of the male ſemen into the female matrix.

EJACULATOR, in anatomy, a name applied to two muſcles of the genitals, from their office in the ejaculation of the ſeed. The ejaculatories ariſe from the ſphincter of the anus, and advance along the urethra, as far as the middle thereof, where they are inſerted laterally.

The ſame denomination is likewiſe given to two muſcles of the clitoris, which, ariſing from the ſphincter ani, advance laterally along the labia, and are inſerted aſide of the clitoris.

EJACULATORIA, or EJACULANTIA *Vaſa*, in anatomy, are the veſſels which receive the ſeminal matter elaborated in the teſtes, and convey it to the penis: theſe are the epididymis, the vaſa deferentia, the veſiculæ ſeminales, and the proſtatæ.

EJECTION, in the animal œconomy, evacuation, or the diſcharging any thing through ſome of the emunctories, as by ſtool, vomit, *&c.*

EJECTIONE CUSTODIÆ, in law, a writ that lies againſt a perſon who caſts out the guardian from any land during the minority of the heir.

The writ *raviſhment de gard* is of the like nature with this; as is alſo *droit de gard.*

EJECTIONE *firmæ*, in law, is a writ which lies for the leſſee for a term of years, who is ejected, either by the leſſor or a ſtranger, before his term is expired. See the article EJECTMENT.

EJECTMENT, *ejectione firmæ*, in law, a writ, or action, which lies for the leſſee for years, on his being ejected, or put out of his land before the expiration of his term, either by the leſſor, or a ſtranger. It may alſo be brought by the leſſor againſt the leſſee, for rent in arrears; or holding over his term, *&c.* Ejectment of late years is become an action in the place of many real actions, as writs of right, formedons, *&c.* which are very difficult, as well as tedious and expenſive; and this is now the common action for trial of titles, and recovering of lands, *&c.* illegally held from the right owner, yet where entry is taken away by diſcents, fines, recoveries, deſſeiſins, *&c.* an ejectment ſhall not be brought; whereby, we find, that all titles cannot be tried by this action.

The method of proceeding in the action of ejectment is to draw a declaration, and feign therein a leaſe for three, five, or ſeven years, to him that would try the title; and alſo feign a caſual ejector, or defendant, and then deliver the declaration to the ejector, who ſerves a copy of it on the tenant in poſſeſſion, and gives notice, at the bottom, for him to appear and defend his title; or that he the feigned defendant will ſuffer judgment by default, whereby the true tenant will be turned out of poſſeſſion: to this declaration the tenant is to appear, the beginning of next term, by his attorney, and conſent to a rule to be made defendant, inſtead of the caſual ejector, and take upon him the defence, in which he muſt confeſs leaſe, judgment, entry, and ouſter, and at the trial ſtand upon the title only: but in caſe the tenant in poſſeſſion does not appear, and enter into the ſaid rule in time, after the declaration ſerved then, on affidavit being made of the ſervice of the declaration, with the notice to appear as aforeſaid, the court will order judgment to be entered againſt the caſual ejector by default, and thereupon the tenant in poſſeſſion, by writ *habere facias poſſeſſionem*, is turned out of his poſſeſſion. On the trial in ejectment, the plaintiff's title is to be ſet forth from the perſon laſt ſeiſed in fee of the lands in queſtion, under whom the leſſor claims down to the plaintiff, proving the deeds, *&c.*

and the plaintiff ſhall recover only according to the right which he has at the time of bringing his action. And here, another who hath title to the land, upon a motion made for that purpoſe, may be defendant in the action with the tenant in poſſeſſion, to defend his title; for the poſſeſſion of the lands is primarily in queſtion, and to be recovered, which concerns the tenant, and the title thereto is tried collaterally, which may concern ſome other.

EIGHT, or PIECE OF EIGHT. See COIN.

EIGHT pair of the nerves. See NERVE.

EIMBECK, a town of lower Saxony, belonging to the elector of Hanover, twenty-five miles ſouth of Hildeſheim.

EISLEBEN, a town of Upper Saxony, five miles eaſt of Mansfield, remarkable for being the birth-place of Luther.

ELABORATION, the art of finiſhing, or perfecting, any thing, with labour and time.

The term is chiefly uſed, in medicine, where the chyle, blood, and ſemen are ſaid to be well elaborated, when they are well conditioned, have undergone all the ſecretions, mixtions, impregnations, and circulations neceſſary to bring them to perfection.

ELABORATORY, the ſame with laboratory. See the article LABORATORY.

ELÆAGNUS, DUTCH MYRTLE, in botany, a genus of trees, belonging to the tetrandria-monogynia claſs of Linnæus, the characters of which are, that it has no flower-petals; the fruit is an oval, obtuſe, and ſmooth drupe, including an oblong kernel or nut.

As to the medicinal virtues of its leaves, which are the only parts in uſe, they are reputed drying, diſcutient, and good againſt worms.

ELÆOCARPUS, in botany, a genus of the polyandria monogynia claſs of plants, the calyx of which is a five-leafed perianthium: the corolla conſiſts of five jagged torn petals, of the length of the cup: the fruit is a roundiſh drupe; and the ſeed a criſp ſpherical nucleus.

ELÆOSACCHARUM, in pharmacy, a preparation of ſome eſſential oil with ſugar, thus performed: grind an ounce of dry loaf-ſugar to an impalpable powder, in a glaſs mortar, and with a glaſs-peſtle, and by degrees add thereto a dram of any eſſential oil, or only half a dram, if the oil be very tenacious; and continue rubbing them together, till all the oil be thoroughly mixed, and drank in by the ſugar. If a little freſh white of an egg be added in the grinding, the oil becomes thereby more eaſily miſcible; but the mixture will not keep ſo long, without turning rancid.

If theſe elæoſaccharums be well prepared, dried, and put into clean glaſſes, exactly cloſed with glaſs ſtopples, they may be preſerved a long time perfect. By this method, therefore, you may prepare an excellent medicine, rich in virtues: for if the elæoſaccharum of mint be diſſolved in diſtilled mint-water, then ſtrengthened with the addition of ſpirit of mint, and the mixture ſweetened with the ſyrup of the ſame plant, the whole virtues of mint may be thus obtained.

ELÆOTHESIUM, ελαιοθεσιον, in antiquity, the appointing-room, or place where thoſe who were to wreſtle, or had bathed, anointed themſelves. See GYMNASIUM.

ELAPHEBOLIUM, ελαφηβολιων, in grecian antiquity, the ninth month of the athenian year, anſwering to the latter part of February and beginning of March. It conſiſted of thirty days, and took its name from the feſtival elaphebolia, kept in this month, in honour of Diana the huntreſs; on which occaſion, a cake made in the form of a deer, was offered to her.

ELASMIS, in natural-hiſtory, a genus of talcs, compoſed of ſmall plates in form of ſpangles, and either ſingle, and not farther fiſſile, or, if complex, only fiſſile to a certain degree, and that in ſomewhat thick laminæ. See the article TALC.

Of theſe talcs there are ſeveral varieties, ſome with large and others with ſmall ſpangles, which differ alſo in colour, and other peculiarities.

ELASTIC, in natural philoſophy, an appellation given to all bodies endowed with the property of elaſticity. See the next article.

ELASTICITY, or ELASTIC FORCE, that property of bodies wherewith they reſtore themſelves to their former figure, after any external preſſure; being the ſame with what is otherwiſe called ſpringineſs, very obſervable in a bent bow, ſteel ſprings, and the like.

A perfectly elaſtic body, is that which reſtores itſelf with the ſame force wherewith it was bent, or depreſſed; thoſe which do not ſo reſtore themſelves with exactly the ſame force, being called imperfectly elaſtic bodies.

Philoſophers account for elaſticity from the principles of corpuſcular attraction and repulſion: thus, if a ſteel ſpring, wire, or piece of very thin glaſs, be bent out of its natural poſition, the particles on the convex part are forced ſrom the intimate union they had before; and, on the concave part, they are forced nearer together, or harder upon each other, than in the natural ſtate: in both which caſes, there will be a conſiderable reſiſtance to overcome, and conſequently require a ſuperior force. During this ſtate of the particles, they may be ſaid to be under a ſort of tenſion on one ſide, and compreſſion on the other; and ſince by this force they are not drawn out of each others attraction, as ſoon as the force is remitted or ceaſes to act, the attractive power reduces the particles, and unbends the wire. Now it is well known, that many ſubſtances are compoſed of ſuch fibrous parts or filaments which reſemble fine wires, and are interwoven and diſpoſed in ſuch a manner, as in ſponge, for inſtance, that they cannot be compreſſed without being bent or wreſted ſrom their natural poſition; whence all ſuch bodies will, in ſuch caſes, exert a ſpring or force to reſtore themſelves, in the ſame manner that the bent wire did.

All bodies that we know of, are in ſome degree or other elaſtic, but none of them perfectly ſo; ſuch are moſt metals, ſemimetals, ſtones, and animal and vegetable ſubſtances, however they may differ in degree. Elaſticity ſeems to vary, according to the different denſities of bodies; for the more metals are hammered, the more elaſtic they become; and the elaſticity of the hardeſt tempered ſteel to that which is ſoft, may be found to be as 7809 to 7738.

We may conſider all elaſtic bodies to be made up of ſuch ſtrings or fibres as A B (plate LXXXV. fig. 2. n° 1.) or rather of elaſtic ſtrata parallel to each other, repreſented by A B, in the ball D C. If this ball be ſtruck at D by a hard or elaſtic body, all the ſtrata will be bent in towards C, as expreſſed by the dotted lines, whilſt the ball is flattened or dented at D. But the ſtrata quickly reſtoring themſelves, the ſurface of the ball re-aſſumes its firſt figure, and that more or leſs exactly, according as the elaſticity is more or leſs perfect.

The great law of perfectly elaſtic bodies, is, that their relative velocity will remain the ſame before and after colliſion; that is, perfectly elaſtic bodies will recede from one another after the ſtroke, with the ſame velocity that they came together. Many curious phænomena may be explained from this property in bodies.

If the ivory ball A, (*ibid.* n°. 2.) weighing two ounces, ſtrike with the velocity 16 againſt B at reſt, weighing alſo two ounces, the body B will move forward after the ſtroke with the velocity 16, A remaining at reſt in its place. The reaſon of this is, that the body A loſes one half of its motion by ſtriking the equal body B, and the other half by the elaſticity of B, recovering its former figure. From this experiment, ſeveral pretty odd phænomena ariſe: thus, if a row of ſhovel-board pieces (that is, metalline cylinders of about half an inch in height, and two inches diameter) be laid upon a ſmooth table, and you take a ſingle piece, and drive it againſt the row, the laſt piece of the row will fly off; for if A (*ibid.* n° 3.) ſtrike the row of pieces B, C, D, E, F, G, H, I, in the direction A *a*, then will the laſt piece I fly off to *i* with the ſame velocity that A ſtruck B: and whatever be the velocity of A, no other piece but the laſt piece I will fly off. But if you take two pieces, as A and B, (*ibid*, n° 4.) and ſtrike them together againſt the row C, D, E, F, G, H, I, the two laſt pieces, H and I, will fly off from the other end of the row with the ſame velocity that A and B made the ſtroke.

If three or more pieces are made uſe of to make the ſtroke, the very ſame number will fly off from the other end of the row; and, it is to be obſerved, that the ſame will happen with equal elaſtic balls, ſuſpended in a row by ſtrings of the ſame length.

Again, if the elaſtic body A, (*ibid.* n° 5.) weighing four ounces, ſtrike the quieſcent body B, weighing only two ounces, with a velocity equal to 12; then will the velocity of A, after the ſtroke, be 4, and that of B 16. Juſt the reverſe of this happens, when a leſſer body ſtrikes againſt the greater; in which caſe, the ſtriking or leſſer body will be reflected with one fourth of its firſt motion, and the greater be carried forward with a motion which is as 16.

The magnitude and motions of ſpherical bodies perfectly elaſtic, and moving in the ſame right line, and meeting each other, being given, their motion after reflection may be determined thus: let the bodies be called A and B, and the reſpective velocities *a* and *b*; then, if the bodies tend

Fig. 1. The Common Eel.

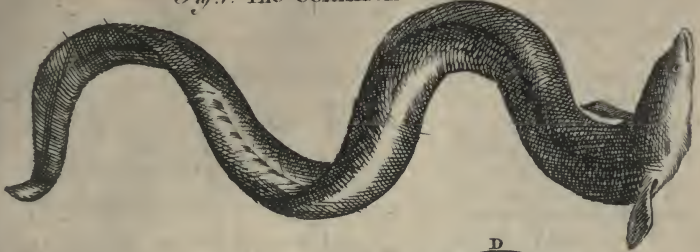


Fig. 2. Elasticity.

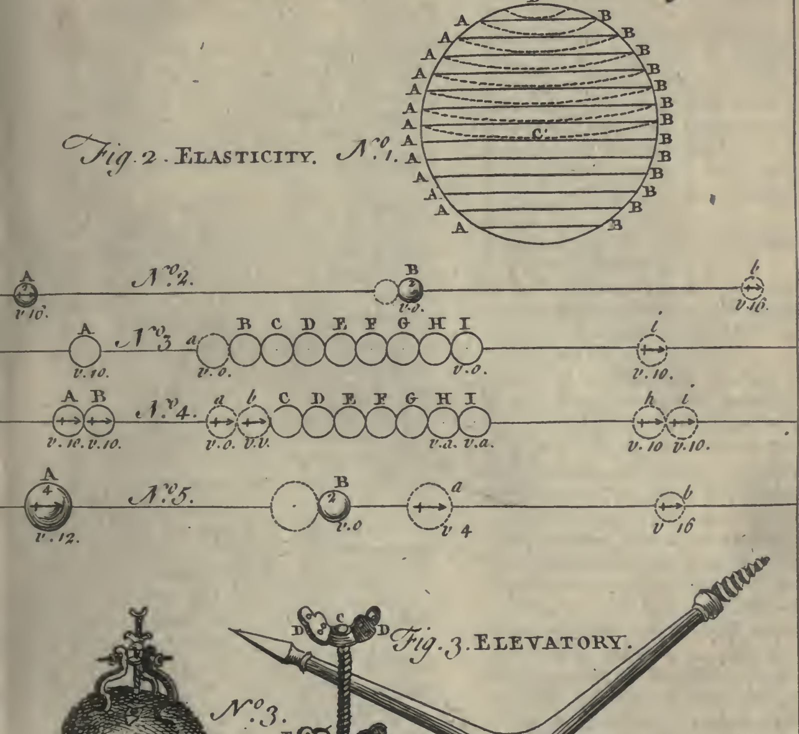
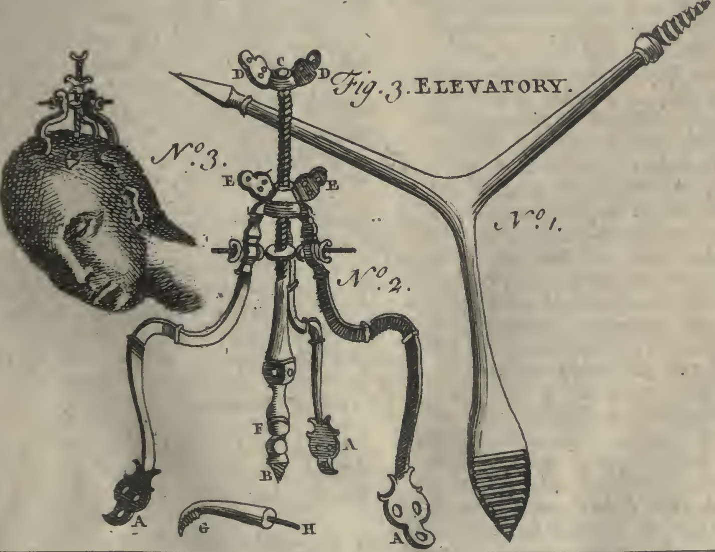


Fig. 3. Elevatory.



J. Jefferys sculp

tend the ſame way, and A, moving ſwifter than B, follows it, the velocity of the body A, after the reflection, will be $\frac{aA - aB + 2bB}{A + B}$, and that of the body B $= \frac{2aA - bA + bB}{A + B}$; but if the bodies meet, then, changing the ſine of b, the velocity of A will be $\frac{aA - aB - 2bB}{A + B}$, and that of B $= \frac{2aA + bA - bB}{A + B}$: and if either of theſe happen to come out negative, the motion after the ſtroke tends the contrary way to that of A before it; which is alſo to be underſtood of the motion of the body A, in the firſt caſe.

For the elaſticity of the air, ſee the article AIR.

ELATE, in botany, a genus of plants, the characters of which are not perfectly aſcertained; the male and female flowers are in the ſame ſpadix; the calyx of the male flower is a bivalve ſpatha: the corolla conſiſts of three roundiſh petals, and the ſtamina are three ſimple filaments; the calyx and corolla of the female flowers are the ſame as in the male, the germen is roundiſh, the fruit is an oval acuminated drupe, and the ſeed an oval furrowed nut. This is alſo the name of ſome botaniſts for the phœnix. See the article PHOENIX.

ELATER, in zoology, a genus of four winged flies, of the order of the coleoptera; the body of which is oblong, and the antennæ ſetaceous: add to this, that the creature, when laid on its back, leaps with great agility.

There are a great many ſpecies of elater, diſtinguiſhed by their different colours, as red, brown, green, blue, and black; which, in ſome ſpecies, are variouſly blended together.

ELATERIUM, in botany, a name by which Boerhaave calls the momordica of other botaniſts. See MOMORDICA.

Elaterium, in pharmacy, imports, in general, any purging medicine; but is particularly applied to thoſe which operate with violence. Hence the word was transferred to the wild cucumber, or momordica, and the preparations thereof. See the article MOMORDICA.

In the writings of Hippocrates, elaterium is frequently mentioned as an external application, of a digeſtive and detergent nature.

ELATINE, FLUELLIN, in botany, a genus of the octandria-tetragynia claſs of plants, the corolla of which conſiſts of four ovated, obtuſe, ſeſſile, patent petals: the fruit is an orbiculated great capſule, compreſſed globeways, containing four cells, and conſiſting of four valves: the ſeeds are numerous, lunulated, erect, and ſurrounding the receptacle in the manner of a wheel. This plant is an aperient, reſolvent, and vulnerary.

This is alſo uſed by Dillenius for antirrhinum, or ſnapdragon. See the article SNAPDRAGON.

ELBE, a large river in Germany, which, riſing on the confines of Sileſia, runs through Bohemia, Saxony, and Brandenburg; and afterwards dividing the dutchy of Lunenburg from that of Mecklenburg, as alſo the dutchy of Bremen from Holſtein, it falls into the german ocean, about ſeventy miles below Hamburgh.

It is navigable for great ſhips higher than any river in Europe.

ELBOW, in anatomy, the juncture of the cubitus and radius; or the outer angle made by the flexure or bend of the arm. See CUBITUS and RADIUS.

ELBOW, in architecture, a term uſed for an obtuſe angle of a wall, building, road, *&c.* which divides it from its right line.

ELCESAITES, in church-hiſtory, antient heretics, who made their appearance in the reign of the emperor Trajan, and took their name from their leader Elceſai. The elceſaites kept a mean between the jews, chriſtians, and pagans; they worſhiped but one God, obſerved the jewiſh ſabbath, circumciſion, and the other ceremonies of the law. They rejected the pentateuch, and the prophets; nor had they more reſpect for the writings of the apoſtles, particularly thoſe of St. Paul. They deteſted chaſtity and continence, and obliged their diſciples to marry. They acknowledged a meſſiah, whom they called their great king; but we do not know whether they meant Jeſus Chriſt, or ſome pretended meſſiah. They gave him a human form, but inviſible, the dimenſions of which were thirty-eight leagues in height, and ſo in proportion. They pretended that the Holy Ghoſt was a woman, and of the ſame ſize with the meſſiah. They were much addicted to judicial aſtrology, magic, and enchantments. They held that it is lawful to renounce the faith with the lips, provided a man kept it in his heart.

ELDER, or SENIORS, in jewiſh hiſtory, were perſons the moſt conſiderable for age, experience, and wiſdom. Of this ſort were the ſeventy men whom Moſes aſſociated to himſelf in the government of his people; ſuch, likewiſe, afterwards were thoſe who held the firſt rank in the ſynagogue, as preſidents.

In the firſt aſſemblies of the primitive chriſtians, thoſe who held the firſt place, were called elders. The word preſbyter, often uſed in the New Teſtament, is of the ſame ſignification: hence the firſt councils of chriſtians were called preſbyteria, or councils of elders.

ELDER is alſo a denomination ſtill preſerved in the preſbyterian diſcipline. See the article PRESBYTERIANS.

They are officers who, with the miniſters and deacons, compoſe the ſeſſions of the kirk. The elder's buſineſs is to aſſiſt the miniſter in viſiting the congregation upon occaſion, to watch over the morals of the people of his diſtrict, and to give them private reproof in caſe of any diſorder; but if the ſcandal be groſs, or the perſon obſtinate, he lays the thing before the ſeſſion. The elders are choſen from among the moſt ſubſtantial, knowing, and regular people, by the ſeſſion or conſiſtory of the kirk. There is a ruling elder in every ſeſſion: he ſhould be a man of ſpotleſs character, and of principal conſideration and intereſt in his pariſh: he is choſen out of the kirk ſeſſion: the congregation is to approve of the choice: the miniſter ordains him before the congregation: he may be choſen to aſſiſt in any church judicatory, and in all manner of government and diſcipline, has an equal vote with the miniſter.

ELDER TREE, *ſambucus*, in botany. See the article SAMBUCUS.

ELDER, or ALDER, *alnus*, in botany. See the articles ALDER and ALNUS.

ELECAMPANE, *helenium*, is ranked by botaniſts among the ſtar-worts. See the article ASTER.

The virtues of elecampane are much cried up, as a ſtomachic, alexipharmic, and ſudorific; and therefore preſcribed in crudities of the ſtomach, the cough, aſthma, plague, and other contagious diſeaſes. Externally, it is recommended againſt the itch, convulſions, and rheumatiſm.

ELECT, *electi*, among eccleſiaſtical writers, thoſe whom God has choſen, or predeſtinated to be ſaved. See the article PREDESTINATION.

ELECT, in matters of polity, is applied to archbiſhops, and other eccleſiaſtic officers, who are choſen, but not yet conſecrated; as alſo to ſecular officers before they are inveſted with their office or juriſdiction: thus the emperor is ſaid to be elect, before he is inaugurated; and the lord mayor of London before his predeceſſor's mayoralty is expired.

ELECTARY, the ſame with electuary. See the article ELECTUARY.

ELECTION, the choice that is made of a perſon, or thing, in preference of any other; as in the election of an emperor, of a pope, of a biſhop, of members of parliament, *&c.* See EMPEROR, CONCLAVE, BISHOP, and PARLIAMENT.

ELECTION is alſo the ſtate of a perſon who is left to his own free will, to take or do one thing or another, which he pleaſes. If a perſon makes a leaſe of land rendering ſo much money in rent, or a quarter of corn, *&c.* the leſſee ſhall have his election which he will render, as being the firſt agent, by payment of the one, or delivery of the other. Where nothing paſſes to a grantee before election, to have one thing or the other, and no time is appointed, the election ought to be made during the life of the parties, and not afterwards: but where an eſtate conveys immediately to the grantee, or donee, *&c.* in that caſe, election may be made by them, or their heirs and executors. And when a donee, or grantee, has his election in what manner he will take the thing granted, there the title or intereſt paſſes immediately, and the party and his heirs, *&c.* are at liberty to make the election when they will.

ELECTION *of a clerk of ſtatutes-merchant*, is the writ that lies for the choice of a clerk, to take bonds, called ſtatutes-merchant; and iſſues out of the court of chancery, upon ſuggeſtion that the clerk formerly aſſigned is gone to dwell in another place, or is under ſome impediment to attend the duty of his office.

ELECTION *of eccleſiaſtical perſons*. There is to be a free election for the dignities of the church, in which no perſon ſhall give any diſturbance, on pain of forfeiture. Where any perſon that has a vote in ſuch elections takes any reward for an election in any church, college, ſchool, *&c.* the election ſhall be void.

ELECTION *of a verderer of the foreſt*, a writ which lies for the choice of a verderer, on the death or removal of any ſuch officer of the foreſt. It is directed to the ſheriff, and the verderer is to be elected by the freeholders of the county.

Election, in theology, ſignifies the choice which God, of his good pleaſure, makes of angels and men for the objects of his grace and mercy. See Reprobation, and Predestination.

Election is alſo uſed, by ſome medical writers, as a part of pharmacy, which conſiſts in a knowledge of the various ſimples which compoſe the materia medica, and directs the choice of drugs.

Election, in numbers, is, with regard to combinations, the different ways of taking any number of quantities given: thus, the quantities *a b c* may be taken different ways, as *a b c*, or *a b*, *a c*, and *a*, *b*, *c*.

ELECTIVE, ſomething that is determined by election. See the preceding article.

The empire of Germany is elective, as is the kingdom of Poland; and among us, the magiſtrates of cities, and other corporate towns, members of parliament, &c. are elective.

ELECTOR, a perſon who has a right to elect or chooſe another to an office, honour, &c.

Elector is particularly, and by way of eminence, applied to thoſe princes of Germany in whom lies the right of electing the emperor: being all ſovereign princes, and the principal members of the empire. The electoral college, conſiſting of all the electors of the empire, is the moſt illuſtrious and auguſt body in Europe. Bellarmine and Baronius attribute the inſtitution of it to pope Gregory V. and the emperor Otho III. in the tenth century; of which opinion are the generality of hiſtorians, and particularly the canoniſts: however, the number of electors was unſettled, at leaſt, till the thirteenth century. In 1356 Charles IV. by the golden bull, fixed the number of electors to ſeven; three eccleſiaſtics, *viz.* the archbiſhops of Mentz, Treves, and Cologne; and four ſeculars, *viz.* the king of Bohemia, count Palatine of the Rhine, duke of Saxony, and marquis of Brandenburg. In 1648 this order was changed, the duke of Bavaria being put in the place of the count Palatine, who having accepted the crown of Bohemia, was outlawed by the emperor; but being, at length, reſtored, an eighth electorate was erected for the duke of Bavaria. In 1692, a ninth electorate was created, by the emperor Leopold, in favour of the duke of Hanover, of the houſe of Brunſwic Lunenburg.

There is this difference between the ſecular and eccleſiaſtic electors, that the firſt have an active and paſſive voice, that is, may chooſe and be choſen; the laſt, an active only. The three archbiſhops are to be thirty years old, before they can be advanced to the dignity; the ſeculars, eighteen, before they can perform the office themſelves. Theſe laſt have each their vicars, who officiate in their abſence.

Beſides the power of chooſing an emperor, the electors have alſo that of capitulating with, and depoſing him; ſo that, if there be one ſuffrage wanting, a proteſt may be entered againſt the proceedings. By the right of capitulation, they attribute to themſelves great privileges, as making of war, coining, and taking care of the public intereſt and ſecurity of the ſtates; and the emperor promiſes, upon oath, to receive the empire upon theſe conditions.

The electors have precedence of all other princes of the empire, even of cardinals and kings; and are addreſſed under the title of electoral highneſs.

Their ſeveral functions are as follow: the elector of Mentz is chancellor of Germany, convokes the ſtates, and gives his vote before any of the reſt. The elector of Cologne is grand chancellor of Italy, and conſecrates the emperor. The elector of Treves is chancellor of the Gauls, and confers impoſition of hands upon the emperor. The count Palatine of the Rhine is great treaſurer of the empire, and preſents the emperor with a globe at his coronation. The elector of Bavaria is great maſter of the imperial palace, and carries the golden apple. The marquis of Brandenburg is grand chamberlain, and puts the ring on the emperor's finger. The elector of Saxony is grand marſhal, and gives the ſword to the emperor. The king of Bohemia is grand butler, and puts Charlemaign's crown on the emperor's head. Laſtly, the elector of Hanover, now king of Great Britain, is arch treaſurer, though firſt erected under the title of ſtandard-bearer of the empire.

ELECTORAL, in general, ſomething belonging to electors. See Elector.

Electoral crown, or **Coronet**. See the article Crown.

ELECTORATE, a term uſed as well to ſignify the dignity of, as the territories belonging to, any of the electors of Germany: ſuch are Bavaria, Saxony, &c.

Contrary to the common uſage of Germany, the electorate, or territories belonging to electors, is hereditary; paſſing entire to the eldeſt ſon.

ELECTRICITY, in phyſiology, that property of certain bodies, whereby, after being rubbed, excited, or heated in ſome particular degree, they acquire a power of attracting and repelling other remote bodies; and frequently of emitting ſparks and ſtreams of light.

The antients, having obſerved that amber, which they called *electrum*, upon being rubbed, attracts bits of ſtraw, down, and other light bodies, firſt gave this property the name of electricity, which they thought peculiar to amber and a few ſtones mentioned by Theophraſtus, Pliny, and ſome others. But the philoſophers of the laſt, and more particularly of the preſent age, have found that numbers of other bodies poſſeſs this quality; and made ſo many diſcoveries in electricity, that there is ſcarce any other ſubject in natural philoſophy that has given occaſion to more experiments.

This quality is of two ſorts, *viz.* vitreous electricity, or that which belongs to glaſs; and reſinous electricity, or that which belongs to amber, roſin, wax, gum, and ſuch like ſubſtances.

The bodies ſuſceptible of electricity, are alſo divided into two claſſes: the one are electrical of themſelves, or *electrica per ſe*; that is, they contain that quality in themſelves, and need only be rubbed, &c. to excite it: the others do not contain that virtue in themſelves, or they have ſo little of it, as to be reckoned to have none at all; yet they acquire it by communication, or by emanation derived to them by a body that is electrical *per ſe:* thoſe bodies are ſimply called non-electrics, or *non electrica per ſe.*

The electrics *per ſe*, or, as they are otherwiſe called, the originally electrics, are, according to Muſchenbroek, all ſorts of gems, ſeveral ſtones, all chryſtals and reſinous ſubſtances, ſulphur, red arſenic, ſalts, alum; all ſorts of glaſs, porcellane, dried vegetables; all woods, ropes, threads of lint, paper, the leaves of trees, the harder reſins, pitch, cotton; parts of animals, as their feathers, hair, horns, bones, ivory, whale-bone, the hide, parchment, the ſhells of fiſhes, ſilk, ſtrings made of dried guts, gum, ſealing-wax, feathered or hairy living animals, as cats, dogs, cocks, &c.

The non-electrics are ſeveral naked animals, or ſuch as are covered with neither hair nor feathers; metals, ſemi-metals, earths and duſt, which, by reaſon of its minuteneſs, won't bear to be rubbed ſeparately; all watry gums, opium, galbanum, ammoniac, aſſa fœtida, camphor; all ſorts of bodies that liquify with a ſmall heat, all moiſt bodies, all fluids which will not bear rubbing, &c.

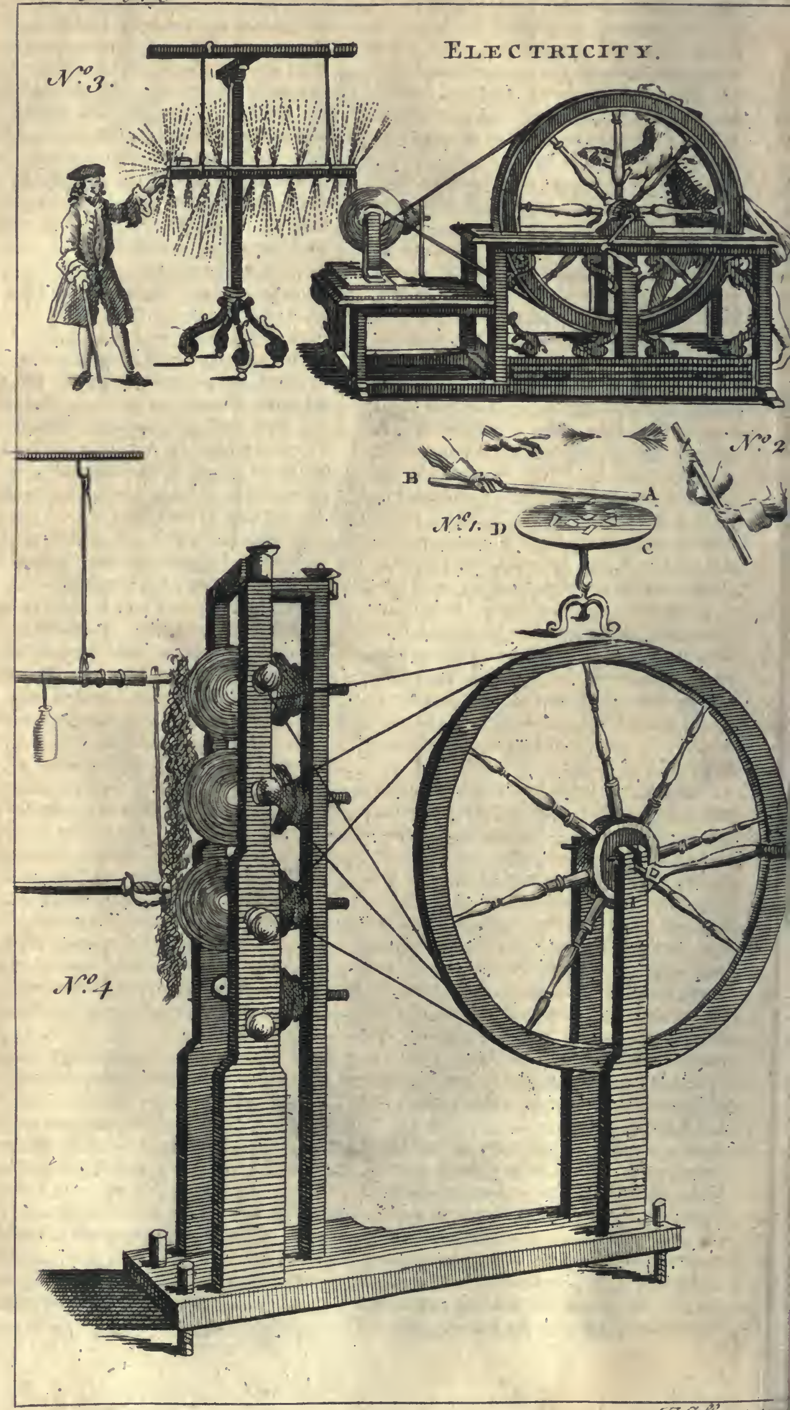
Electricity, according to the ſame author, conſiſts in ſubtile exhalations, which, in exciting the electrical body, are put into motion; and which, by flying to and from it, agitate all thoſe light bodies that fall within the ſphere of their attraction.

That theſe exhalations, or ſubtile effluvia, conſtitute electricity, appears from hence. 1. From the touch, as theſe bodies are perceived to be ſurrounded with a moſt ſubtile atmoſphere, or covered with a gentle blaſt of wind, that continues to breath every where around them. 2. From that offenſive ſmell, which reſembles phoſphorus, the phlegm of aqua regia, or the ſpirit of vitriol. 3. Being taken into the mouth, they yield an acid and aſtringent taſte. 4. They ſeem to adhere to the extremities of the bodies which they ſurround, and from which they recede, in the form of ſparks, and of a ſubtile lucid flame. 5. This flame is ſometimes attended with an exploſion, that may be heard at the diſtance of two hundred paces: beſides, the greater flames occaſion a continued hiſſing, or crackling noiſe in the air. Since, therefore, the electrical effluvia affect all the human ſenſes, we can no longer doubt of their being a corporeal fluid.

Mr. Watſon thinks, that electricity is not furniſhed from the electric bodies employed in the experiments, nor from the circumambient air; but that it is the effect of a very ſubtile and elaſtic fluid occupying all bodies, in contact with the terraqueous globe; that every where, in its natural ſtate, it is of the ſame degree of denſity; that glaſs and other bodies, which are electrics *per ſe*, have the power of taking this fluid from one body and conveying it to another, in a quantity ſufficient to be obvious to all our ſenſes; that, under certain circumſtances, it is poſſible to render the electricity in ſome bodies more rare than it naturally is, that, by communicating this to other bodies, to give them an additional quantity, and make their electricity more denſe; and that theſe bodies will thus continue, until their natural quantity is reſtored to each; that is, by thoſe which have loſt part of theirs, acquiring what they have loſt, and by thoſe to whom more has been communicated, parting with their additional quantity. Both one and the

other

Vol. II. *facing page 1054* Plate L



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other of theſe is, from the elaſticity of the electric matter, attempted to be done from the neareſt non-electric; and when the air is moiſt, this is ſoon accompliſhed by the circumambient vapours, which here may be conſidered as preventing, in a very great degree, our attempts to inſulate non-electric bodies.

In order to illuſtrate the phænomena of electricity, we ſhall give ſome ſelect experiments.

1. Get a glaſs tube A B, of about three feet and a half in length, an inch and a half in diameter, and its ſides a line thick: rub it with a piece of ſtuff, paper, or, which is ſtill better, with the hand, provided it be very dry: you will ſucceed better if your hands be rubbed with chalk, or white lead. Afterwards bring this rubbed tube near any light bodies, as gold-leaf laid upon a glaſs ſtand C D; then will the gold-leaf be attracted and repelled in the manner repreſented in plate LXXXVI. n° 1.

If you do this in ſuch a manner, that the gold-leaf, for example, be perpendicularly repelled above the tube, and that it meet with no other body, it will ſuſtain itſelf in the air, always at the ſame diſtance from the tube, and may be conveyed in this ſituation quite round the room; but if it touch any other body, it will come back and adhere to the tube, and then it will be repelled anew as at the firſt.

2. Again, if the tube be rubbed anew, pretty briſkly, it will attract a feather, or other light body, at a conſiderable diſtance; and after they have ſtuck to it for ſome time, they are again driven off, and it will conſtantly repel them, till they are touched by ſome other non-electrical body, as a finger or ſtick: on which they will be again attracted by the tube; and if the finger be held pretty near the tube, the feather will alternately fly from the tube to the finger, and back again; always ſtretching out its fibres the way that it is going, and that before it comes off from the finger or tube. See plate LXXXVI. n° 2.

Before we proceed to more complicated experiments, it will be proper to obſerve, that, in order to know that non-electrics have received the communicated electricity, they muſt be inſulated: that is, they muſt not be ſuſpended from, nor ſupported by any body, but what is an electric *per ſe*. For if one non-electric be touched by another, and this by a third, &c. all the electricity received by the firſt will go to the ſecond, and from this to the third, &c. till at laſt it be loſt upon the ground. But, if ſeveral non-electric bodies, touching one another, are at length terminated by electric bodies, in that reſpect they make but one body, and receive and retain electricity for ſome time. From hence it may be obſerved, that non-electrics are conductors of electricity. Water conducts it very well, but metals are the moſt convenient conductors.

3. Let an iron-rod, pointed at one end, be ſuſpended on ſilk lines, and by means of a glaſs or roſin ſphere (which can be more regularly and conſtantly excited than a tube) be electrified, it will be found to have all the properties of the excited tube already mentioned; that end of the iron-rod, ſuſpended as already mentioned, which is next the ſphere, muſt point to it at the diſtance of a quarter of an inch. This apparatus being diſpoſed, as repreſented, *ibid.* n° 3. the globe will be electrified in whirling round againſt a leather cuſhion rubbed with whiting, or dry a hand-rubbed in the ſame manner. When the rod, by this means, is ſtrongly electrified, a ſtream of light, in diverging rays, will be ſeen to iſſue from that point of it which is moſt diſtant from the ſphere; and if any non-electric body, as a finger, be placed within a quarter of an inch of the ſaid flame, it will perceive a gentle blaſt of wind from the end of the iron; that is, the electrical fire will iſſue out from the point in ſuch a manner, as to blow againſt the finger very ſenſibly; and if the finger be ſtill held nearer, the large pencil of rays will be condenſed in ſuch a manner, as to run out from the point upon the finger, in a ſtream or body of denſe, yellow fire, and ſtrike the finger like a gentle *jet d'eau*. The rod ſuſpended before the glaſs-ſphere, is properly termed the prime conductor in this machine.

4. While the flame continues to appear from the end of the iron-rod, the finger being placed any where upon it, the flame at the end diſappears immediately; and when the finger is taken off, it again inſtantly appears; and ſo by putting the finger off and on ſucceſſively, the electric flame will appear and diſappear alternately. Theſe eruptions of the electrical fire will ſnap very ſenſibly, both to the eye and the ear, upon any part of the rod that the finger is pointed to. See plate LXXXVI. n° 3.

5. If a chain, or hempen cord, be ſuſpended by ſilken ſtrings all round the room, of any length you pleaſe, and one end thereof be hung, by a loop, acroſs the rod, the electrical fire will inſtantly be tranſmitted through the whole length of the chain, and appear upon every part at the approach of the finger, and be heard to ſnap and ſtrike with as great force as from the rod itſelf.

6. Take two plates of metal, very clean and dry, whoſe ſurfaces are nearly equal; hang one of them horizontally to the electrified rod, and bring under it, upon the other, any thin light body, as ſilver leaf, &c. When the upper plate is made electrical, the ſilver will be attracted by it; and if the under plate is held at a proper diſtance, will be perfectly ſuſpended at right angles to the plates, without touching either of them; but if they are either brought nearer together, or carried farther aſunder, the leaf will ceaſe to be ſuſpended, and will jump up and down between them.

The ſame effect will be produced, if the experiment is reverſed by electrifying the bottom plate, and ſuſpending the other over it.

7. The following improvement, upon the electrical machine of the abbe Nollet, already exhibited, was made by Mr. Watſon in 1746. In the periphery of his machine, ſee plate LXXXVI. n° 4. were cut four grooves, correſponding with four globes, which were diſpoſed vertically: one, two, or the whole number of theſe globes might be uſed at pleaſure. They were mounted upon ſpindles, and the leather-cuſhion with which they were rubbed, was ſtuffed with an elaſtic ſubſtance, as curled hair, and rubbed over with whiting. One of the globes was lined to a conſiderable thickneſs with a mixture of wax and roſin, but no difference appeared in the power of this globe from the others.

For performing moſt of the following experiments, ſome have imagined a gun-barrel abſolutely neceſſary, as the prime conductor; but Mr. Watſon ſays, that a ſolid piece of metal, of any form, is equally uſeful; having obſerved the ſtroke from a ſword, as violent as that from a gun-barrel.

If, to the ſuſpended barrel, a ſpunge, thoroughly dry, be hung, it gives no appearance of fire, which ſhews it to be an electric ſubſtance; but if when the ſpunge has been immerſed in water, it be ſuſpended to the barrel, and the finger applied near it, the fire iſſues out with conſiderable force and ſnappings; and the drops, which, before the ſpunge was applied, fell very ſlowly, will now fall as faſt: if the room be darkened, theſe drops will appear to be drops of fire, and illuminate the baſon into which they fall.

8. If a phial of water is ſuſpended to the prime conductor by a wire, let down a few inches into the water through the cork; and ſome metallic fringes, inſerted into the barrel, touch the globe in motion, the electrical power may be ſo accumulated in the phial, that a man graſping it with one hand, and touching the gun-barrel with a finger of the other, will receive a violent ſhock through both his arms, eſpecially at his elbows and wriſts, and acroſs his breaſt.

The commotion ariſing from the diſcharge of accumulated electricity in a phial, may be felt by a great number of men at once. M. le Monnier, at Paris, is ſaid to have communicated this ſhock through a line of men, and other non-electrics, meaſuring nine hundred toiſes, being more than an engliſh mile; and the abbe Nollet made the experiment upon two hundred perſons ranged in two parallel lines.

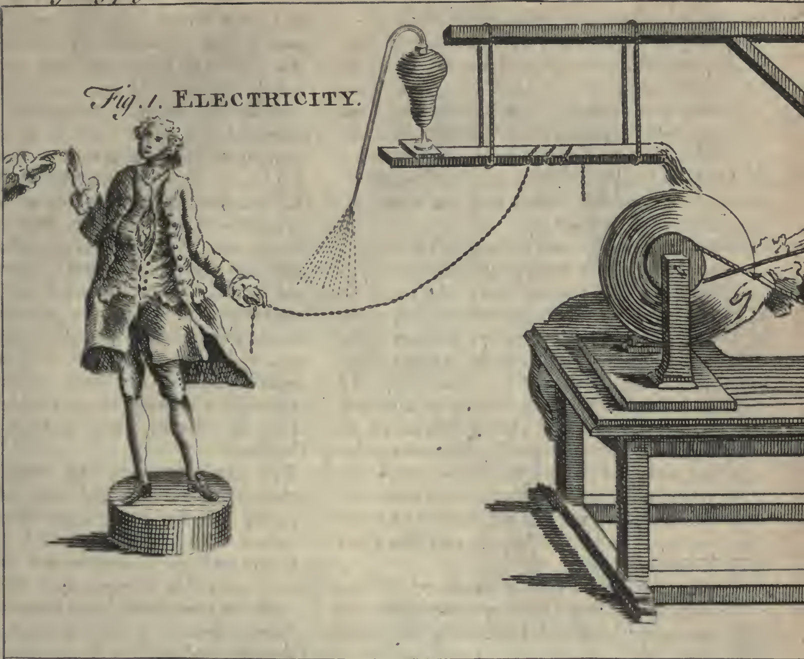
9. If the electrical machine, and the man who turns the wheel thereof, be mounted on electrical cakes, the electrical power is ſo far from being increaſed, that, on the contrary, it is ſo much diminiſhed, as to be oftentimes not at all perceptible.

10. A perſon ſtanding on a cake of roſin, holding a chain faſtened to the prime conductor, will be electrized; that is, he will be all over poſſeſſed with electric virtue; and, at the ſame time, feel nothing of it, unleſs ſome perſon ſtanding by put his finger near to any part, and then the virtue will be emitted in form of fire, and ſnap and become very ſenſible to both the parties. See plate LXXXVII. fig. 1.

11. A perſon ſtanding on roſin, holding the chain of the conductor, points his finger to the warm ſpirits of wine; and by communicating the electric fire thereto, kindles the riſing vapour, and ſo ſets the whole on fire. In this manner any ſort of matter, which, when warmed, will ſend forth an inflammable vapour, will be ſet on fire. See plate LXXXVII. fig. 2.

The electrical commotion, mentioned in experiment 8, ariſing from an accumulation of the electrical fire, has been made very

Fig. 1. ELECTRICITY.



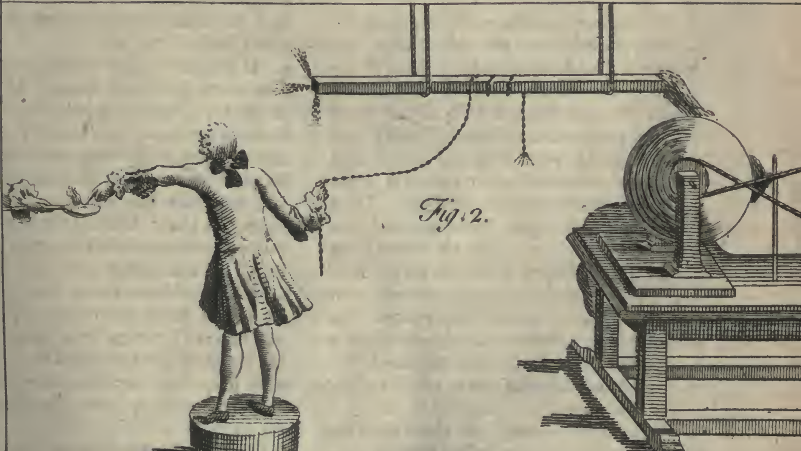
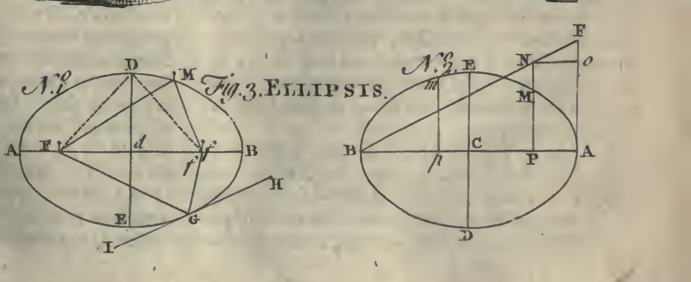


Fig. 2.

Fig. 3. ELLIPSIS.



J. Jeffery

very ſenſible quite croſs the river Thames, by the communication of no other medium than the water of that river, and ſpirit of wine fired at that diſtance.

By comparing the reſpective velocities of electricity and ſound, that of electricity, in any diſtance yet experienced, appears inſtantaneous.

12. If the globe be exhauſted of all its air, and then whirled about, the electricity will be obſerved to act wholly within the globe, where it will appear, in a darkened room, in form of a cloud or flame of reddiſh or purple-coloured light, filling the whole capacity of the globe.

13. If a loadſtone, armed with iron, be hung on to the gun-barrel by an iron-wire, the electric virtue will ruſh out from every part, but more forcibly from the iron than from the ſtone itſelf: for from the ſtone, it ſeems to be emitted in a more lax manner, and diffuſed in a ſort of ſteam, or fiery vapour; whereas from the iron, it iſſues in a more impetuous, denſe, and penetrating ſteam; by which we learn, that the two moſt conſiderable powers of nature, electricity and magnetiſm, do not always interfere, or impede each other's actions.

14. The method of firing gunpowder by the electric flame, has ſomething particular in it; as it does not require any inflammable vapour to be previouſly raiſed. The powder may be fired thus: a ſmall cartridge is filled with dry powder, hard rammed, ſo as to bruiſe ſome of the grains: two pointed wires are then thruſt in, one at each end, the points approaching to each other in the middle of the cartridge, till within the diſtance of half an inch: then the cartridge being placed in the circle, when four electrified glaſs-jars are diſcharged, the electric flame leaping from the point of one wire to the point of the other within the cartridge, among the powder, fires it, and the exploſion of the powder is at the ſame inſtant with the crack of the electrical diſcharge.

15. As to metals, Dr. Franklin tells us, that he has been able, by electricity, to give polarity to needles, and to reverſe it. A ſhock from four large glaſs-jars ſent through a fine ſewing needle, gives it polarity.

16. In conſequence of Dr. Franklin's hypotheſis, of being able, by a proper apparatus, to collect the electricity from the atmoſphere during a thunder-ſtorm, it has been found, that a pointed bar of iron, forty feet high, being placed upon an electric body; and a ſtormy cloud having paſſed over the place where the bar ſtood, thoſe, appointed to obſerve it, attracted from it ſparks of fire, perceiving the ſame kind of commotions as in the common electrical experiments. The like effect followed when a bar of iron ninety-nine feet high was placed upon a cake of roſin two feet ſquare, and two inches thick: theſe were the firſt experiments made, but they have ſince been ſufficiently varied and verified, ſo that it ſeems now certain. 1. That a bar of iron, pointed or not, is electrized during a ſtorm. 2. That a vertical, or horizontal ſituation, is equally fitting for theſe experiments. 3. That even wood is electrized. 4. That, by theſe means, a man may be ſufficiently electrized to ſet fire to ſpirit of wine with his finger, and repeat almoſt all the uſual experiments of electricity.

17. Dr. Franklin has contrived a very ingenious and eaſy method of trying experiments of this kind, by means of an electrical kite, made of a large thin ſilk handkerchief, extended and faſtened, at the four corners, to two ſlight ſtrips of cedar, of ſufficient length for this purpoſe. This kite being accommodated with a tail, loop, and ſtring, will riſe in the air like thoſe of paper. To the top of the upright ſtick of the croſs, is to be fixed a very ſharp-pointed wire, riſing a foot or more above the wood. To the end of the twine, next the hand, is to be tied a ſilk ribband; and, where the twine and ſilk join, a key may be faſtened. The kite is to be raiſed when a thunder-guſt appears to be coming on; and as ſoon as the thunder clouds come over the kite, the pointed wire will draw the electric fire from them, and the kite, with all the twine, will be electrified; and the looſe filaments of the twine will ſtand out every way, and be attracted by an approaching finger. When the rain has wet the kite and twine, ſo that it cannot conduct the electric fire freely, it will ſtream out plentifully from the key on the approach of a man's knuckle. At this key a phial may be charged; and from the electric fire, thus obtained, ſpirits may be kindled, and all the other electrical experiments be performed, which are done by the help of a glaſs-ſphere or tube; and the ſameneſs of the electric matter with that of lightning,

may thereby be completely demonſtrated. From this identity ſome have conceived hopes of depriving the clouds of all their thunder, and thereby rendering thunder-ſtorms harmleſs.

18. Mr. Stephen Gray, juſt before he died, hit upon an experiment which ſeemed to indicate, that the attractive power, which regulates the motions of the heavenly bodies, is of the electric kind. The experiment was thus: he fixed a large, round, iron-ball upon the middle of a large cake of roſin and wax; and exciting the virtue ſtrongly in the cake, a fine feather, ſuſpended by a thread, and held near the iron-ball, was carried round it, by the effluvia, in a circular manner, and performed ſeveral revolutions: it moved the ſame way with the planets, from weſt to eaſt, and its motion, like theirs, was not quite circular, but a little elliptical.

Theſe being moſt of the capital experiments hitherto exhibited in electricity, we ſhall conclude this article by mentioning ſome of the medicinal virtues lately attributed to this ſubject of philoſophy. It has been pretended, that odours will pervade electrified globes and tubes of glaſs; and that the medicinal effects of drugs might likewiſe be tranſmitted this way; as alſo, that, if perſons were to hold in their hands, or place under their naked feet, odoriferous or purging ſubſtances, and were then to be electrized, they would be ſenſible of the effects of theſe ſubſtances: but this ſeems now to be an impoſition on the credulity of the world, no ſuch effects having ever been perceived. However, it does not follow that medicinal advantages are not to be gained from electricity itſelf; ſo ſubtile and ſo elaſtic a fluid admitted in a large quantity into our bodies, as, from undoubted experience, it greatly heats the fleſh and quickens the pulſe, may more eſpecially, when aſſiſted with the expectation of ſucceſs in the patient, in particular caſes, be attended with advantages. In effect, we meet with ſome cures performed in paralytic caſes, by the force of electricity.

ELECTRUM, *amber*, in natural hiſtory. See the article AMBER.

ELECTUARY, in pharmacy, a form in which both officinal and extemporaneous medicines are frequently made.

It may be conſidered as a number of boluſes united together, but is made ſomewhat ſofter, by an addition of a due proportion of preſerves or ſyrups. When the conſiſtence is very ſoft, it is called, ſometimes, by the name of opiates. See the articles BOLUS and OPIATES.

The principal conſideration in preſcribing officinal electuaries is, that ſuch things only be put together, as will not, by any oppoſite qualities, deſtroy one another, or loſe their natural properties, by lying long in this manner; and likewiſe that the whole be of a conſiſtence that will hold ingredients of different gravities in equal mixture.

Extemporaneous electuaries differ principally from the officinal, in that the latter are confined to ſuch things as will for a long time keep together; whereas the former may be ventured on with materials which will not remain long without change, provided they agree in intention; as conſerves with the teſtaceous powders, preparations with ſteel, and the like, will continue together long enough for preſent uſe, but will not lie many days without fermenting and ſpoiling.

The ſtronger cathartics ought not to be truſted in this form, becauſe the manner of taking does not ſufficiently aſcertain the doſe. The moſt powerful alexipharmics alſo, which are commonly given in acute caſes, are not conveniently thus truſted, ſo that an electuary is hardly ever met with in a fever. The quantity of an extemporaneous electuary ſhould ſeldom exceed three ounces; and thereabout will an ounce and a half of conſerve, two drams of the common powders, with a ſufficient quantity of ſyrup, amount to; though cinnabar, and ſome of the heavier things, will not take up ſo much: and if this rule, as to quantity, be not obſerved by the preſcriber, but more be ordered, it is a common thing for the compounder to do it for him, by proportioning the materials ſuitable thereto, as by making up half or a third of what is directed.

ELEEMOSYNÆ and **ELEEMOSYNARIUS**. See ALMS and ALMONER.

ELEGANCE, or **ELEGANCY**, an ornament of politeneſs and agreeableneſs, ſhewn in any diſcourſe, with ſuch a choice of rich and happy expreſſions, as to riſe politely above the common manners, ſo as to ſtrike people of a delicate taſte, and diffuſe a reliſh which hits every body.

It is obſerved that elegance, though irregular, is preferable to regularity without elegance: that is, by being ſo ſcrupulous of grammatical conſtruction, we loſe certain licences wherein the elegance of language conſiſts.

Elegance, in painting, a certain manner which embelliſhes and heightens objects, either as to their form, colour, or both, without deſtroying or perverting the truth. It is not ſeen in the correctneſs of the deſign, as appears from Raphael, and the antique. It is moſt ſenſibly perceived in works otherwiſe careleſs and inaccurate, as in Corregio, where, notwithſtanding all the defects as to juſtneſs of deſign, there is an elegance even in the manner of the deſign itſelf, as well as in the turn of the attitudes, *&c.*

ELEGIAC, in antient poetry, any thing belonging to elegy. See Elegy.

Elegiac verſes are alternately hexameter and pentameter, as in the following verſes of Ovid. See the articles Hexameter and Pentameter.

Flebilis indignos, elegeia, ſolve capillos.
Ah nimis ex vero nunc tibi nomen erit.

Sometimes, though very rarely, the pentameter preceded the hexameter, as in the following verſes of Athenæus.

Ευδαιμων Χαριτων, και Μελανιππος εφυ
Θειας αγιστηρες εφημεριοις φιλοτητος.

Who was the inventor of elegiac poetry, is not known. Horace profeſſes himſelf quite ignorant of it. The principal writers of elegiac verſe, among the Latins, were Propertius, Ovid, and Tibullus, the latter whereof Quintilian eſteems the beſt elegiac poet; but Pliny the younger gives the preference to the firſt: the chief writers of elegy among the Greeks were Callimachus, Parthenius, and Euphorion.

ELEGIT, in law, a writ of execution, which lies for a perſon who has recovered debt or damages; or upon a recognizance in any court, againſt a defendant that is not able to ſatisfy the ſame in his goods.

It is directed to the ſheriff, commanding him to make delivery of a moiety of the party's lands, and all his goods, beaſts of the plough excepted; this is done by a jury, ſummoned to enquire what land the defendant had at the time of the judgment obtained; and the creditor, by virtue thereof, ſhall hold the ſaid moiety of land delivered to him, until his whole debt and damages are paid and ſatisfied: and during that time he is tenant by elegit. This writ ought to be ſued out within a year and a day after the judgment.

All other writs of execution may be good, though not returned, except it be an elegit; but that muſt be returned when executed, becauſe an execution is taken upon it, and that the court may judge of the ſufficiency thereof.

ELEGY, a mournful and plaintive kind of poem. See the article Elegiac.

As elegy, at its firſt inſtitution, was intended for tears, it expreſſed no other ſentiments, it breathed no other accents but thoſe of ſorrow: with the negligence natural to affliction, it ſought leſs to pleaſe than to move; and aimed at exciting pity, not admiration. By degrees, however, elegy degenerated from its original intention, and was employed upon all ſorts of ſubjects, gay or ſad, and eſpecially upon love. Ovid's book Of Love, the poems of Tibullus and Propertius, notwithſtanding they are termed elegies, are ſometimes ſo far from being ſad, that they are ſcarce ſerious. The chief ſubjects then to which elegy owes its riſe, is death and love: that elegy therefore ought to be eſteemed the moſt perfect in its kind which has ſomewhat of both at once; ſuch, for inſtance, where the poet bewails the death of ſome youth or damſel falling a martyr to love.

ELEMENT, in phyſiology, a term uſed by philoſophers to denote the original component parts of bodies, or thoſe into which they are ultimately reſolvable.

The elements or principles to which all bodies may be ultimately reduced, are theſe five: 1. Water, or phlegm, which, in the chemical analyſis of them, riſes firſt in form of vapour. 2. Air, which eſcapes unſeen in great quantities from all bodies, ſo as to conſtitute half the ſubſtance of ſome of them. 3. Oil, which riſes after, and appears ſwimming on the ſurface of the water. 4. Salt, which is either volatile, or riſes in the ſtill, as that of animal ſubſtances; or fixed, as that of vegetables, which is obtained by reducing them to aſhes, making a lixivium or lye of theſe, and afterwards evaporating the moiſture; by which means the ſalt ſhoots into cryſtals. 5. Earth, or what is called the caput mortuum, being what remains of the aſhes after the ſalt is extracted. This is the laſt element of all bodies, which can be no farther altered by any art whatſoever. See the articles Water, Air, *&c.*

Elements are conceived as the moſt ſimple, homogeneous parts, or corpuſcles; of an aſſemblage and mixture whereof all the bodies we ſee conſiſt. Authors generally

rally talk wildly, and inconſiſtently, of the elements; and confound them with the principles of things: yet there is a great deal of difference. And ſince they find by experience, that every thing is not made indifferently out of another, as that ſtones are not proper to be converted into fleſh, nor will they ſerve to nouriſh it; ſo they judge by analogy that all ſorts of bodies are not compounded of principles alone, in the moſt ſimple manner poſſible; but only ſome very ſimple things, of the mixture of which all other things are afterwards compounded: theſe are what philoſophers call elements, which differ from principles in this, that a principle, ſuch as matter, is an incomplete and undetermined thing; whereas an element is complete and determined. See the article PRINCIPLE.

There muſt, therefore, be more than one element, otherwiſe there would be but one uniform ſimplicity in nature. But philoſophers have not agreed what is meant by element, becauſe they have not ſo much enquired into the nature of things, as into the ſenſations which they are apt to raiſe in us. Thus, ſome philoſophers who conſidered the ſenſe of ſeeing only, have aſſerted that light and darkneſs were the elements of things: and others, who referred every thing to feeling, have pretended, that hard and liquid, hot and cold, were the elements.

Ariſtotle may be placed amongſt theſe laſt, though he proceeded in a different manner; he firſt conſidered the principal qualities that come under the ſenſe of feeling, as heat, cold, drineſs, or hardneſs, and humidity or liquidity. And, after he had obſerved that two of theſe qualities might meet in the ſame ſubject, and that the four might be combined four different ways, he compoſed four elements, cold and dry; cold and moiſt; hot and moiſt; and hot and dry.

Then, in order to give names to them, he examined what thoſe things in nature were, in which one element ſeemed to prevail. Thus imagining the earth to be both the coldeſt and drieſt of all things, he called his firſt element earth; ſo likewiſe, becauſe he thought that water was the coldeſt and moiſteſt thing, he called his ſecond element water; farther, as he imagined, nothing more moiſt and hot than air, he called his third element air; and, laſtly, not doubting but that fire is the hotteſt and drieſt thing in the world, he called his fourth element fire.

It is not to be ſuppoſed, that this earth which we inhabit, this water which we drink, this air which we breathe, and this fire which we kindle, are the four elements Ariſtotle meant; for the name element is only given to the moſt ſimple body, whereas the four juſt mentioned are the moſt compounded of any we know.

The carteſians admit only three elements, the firſt a materia ſubtilis, or fine duſt; the ſecond, a coarſer, but round kind; and the third, a ſtill more irregular and hooked kind of particles. See the article CARTESIANS, *&c.*

Our great Sir Iſaac Newton conſiders the primary elements of bodies on the atomical ſyſtem, thus; all things conſidered, it ſeems probable, that God, in the beginning, formed matter in ſolid, maſſy, hard, impenetrable, moveable, particles, of ſuch ſizes and figures, and with ſuch other properties, and in ſuch proportion to ſpace, as moſt conduced to the end for which he formed them; and that theſe particles, being ſolid, are incomparably harder than any porous bodies compounded of them; even ſo very hard, as never to wear or break in pieces, no ordinary power being able to divide what God himſelf made one in the firſt creation. While the particles continue entire, they may compoſe bodies of one and the ſame nature and texture in all ages: but, ſhould they wear away, or break in pieces, the nature of things depending on them would be changed. Water and earth compoſed of old worn particles, and fragments of particles, would not be of the ſame nature and texture, now, with water and earth compoſed of entire particles in the beginning. And therefore, that nature may be laſting, the changes of corporeal things are to be placed only in the various ſeparations and new aſſociations and motions of theſe permanent particles; compound bodies being apt to break, not in the midſt of ſolid particles, but where thoſe particles are laid together, and only touch in a few points.

ELEMENT, in a figurative ſenſe, is uſed for the principle and foundations of any art or ſcience, as Euclid's Elements, *&c.*

ELEMI, or **ELEMY**, in the materia medica, a kind of reſin, very improperly called gum-elemi. There are two ſorts of it kept in the ſhops, the one genuine, and brought from Ethiopia; the other ſpurious, and the produce of America. The true

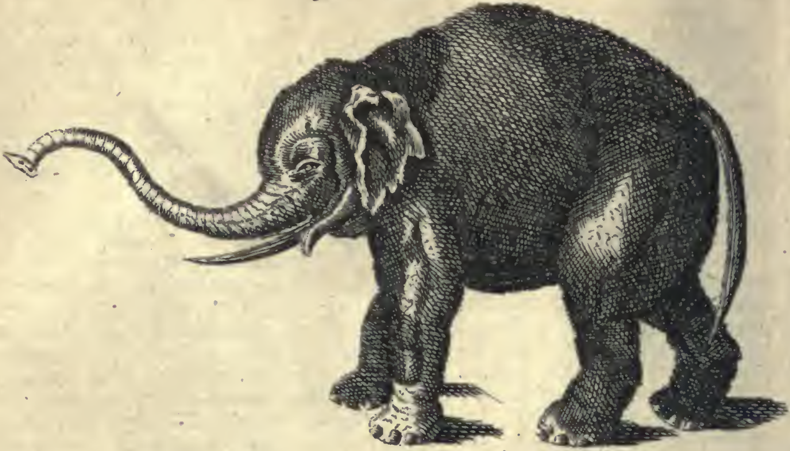


Fig. 1. THE ELEPHANT.

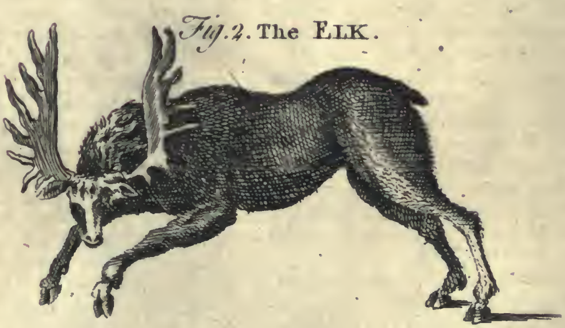


Fig. 2. THE ELK.

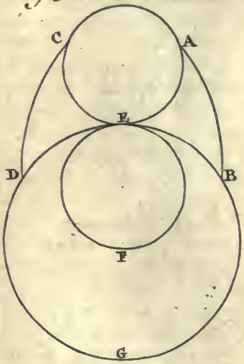


Fig. 3. EPICYCLOID.

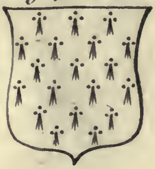


Fig. 4. ERMIN.

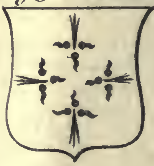


Fig. 5. ERMINE.

J. Jefferys sculp.

true kind is a yellowiſh reſin, with a caſt of green and white; its ſmell is acrid and pleaſant, and its taſte acrid and bitter. It is very inflammable, and readily diſſolves in oil, and other fat ſubſtances, over the fire; which two characters alone ſufficiently diſtinguiſh it from the gums: but this genuine elemi is very rare in Europe.

The ſpurious elemi is a whitiſh reſin, produced from a tall tree, with pinnated leaves, not unlike thoſe of the pear-tree. It is in ſome degree pellucid, and of a fragrant ſmell. It is only uſed externally, being greatly recommended for reſolving tumours, deterging ulcers, wounds, *&c.*

ELENCHUS, in logic, a ſophiſm, or fallacious argument, which deceives the hearer under the appearance of truth. See the article SOPHISM.

ELEOSACCHARUM, or ELÆOSACCHARUM. See ELÆOSACCHARUM.

ELEPHANT, *elephas*, in zoology, a genus of quadrupeds, of the order of the jumenta, the characters of which, according to Linnæus, are theſe: it has no fore-teeth; the upper canine, or dog-teeth, are conſiderably long; it has a very long flexible proboſcis or trunk, and two paps placed on the breaſt. See plate LXXXVIII. fig. 1.

The teeth of this animal is what we call ivory. See the article IVORY.

The elephant, of which there is only one known ſpecies, is, when full grown, from ſeventeen to twenty feet high; and its body is withal ſo enormouſly bulky, that the belly reaches nearer the ground than could eaſily be conceived of a creature of its height. The trunk is, properly ſpeaking, nothing but the noſe continued to a great length; its ſubſtance is fleſhy, but firm, being compoſed of three ſeries or orders of fibres: this trunk the creature can contract or protrude forward with great violence, from the length of one foot to five or more.

Knights of the ELEPHANT, an order of knighthood in Denmark, conferred upon none but perſons of the firſt quality and merit. It is alſo called the order of St. Mary. Its inſtitution is ſaid to have been owing to a gentleman among the daniſh croiſees having killed an elephant, in an expedition againſt the Sarracens, in 1184, in memory of which king Canutus inſtituted this order, the badge of which is a towered elephant, with an image of the holy virgin encircled with rays, and hung on a watered ſky-coloured ribbon, like the George in England.

ELEPHANTIASIS, ελεφαντιασις, called alſo lepra Arabum, in medicine, a chronical diſeaſe, one of the two ſpecies of leproſy, which affects the whole body, where even the bones as well as the ſkin are covered with ſpots and tumours, which being red, at laſt turn black. See the article LEPROSY.

In this diſeaſe the body falls away, while the legs and feet are enormouſly ſwelled. When the diſeaſe is inveterate, the fingers and toes are hid in the tumour, and a ſlight fever ariſing, carries the patient off.

Lucretius ſuppoſed this diſeaſe to be generated in Egypt, and no where elſe; but if the leproſy of the Jews is the ſame with that of the negroes, which is highly probable, then it may be affirmed that it is endemial to the ſouthern and inland parts of Africa.

ELEPHANTINE, in roman antiquity, an appellation given to the books wherein were regiſtered the tranſactions of the ſenate and magiſtrates of Rome, of the emperors or generals of armies, and even of the provincial magiſtrates; the births and claſſes of the people, and other things relating to the cenſus.

They are ſuppoſed to have been ſo called as being made of ivory; though ſome will have them to have been written on the inteſtines of elephants.

ELEPHANTOPUS, BASTARD SCABIOUS, in botany, a genus of the ſyngeneſia-polygamia æqualis claſs of plants, the compound flower of which is tubuloſe, conſiſting of four or five hermaphrodite and ligulated corollulæ, with a narrow limb, divided into five nearly equal ſegments: the ſtamina are five very ſhort filaments: the ſeeds are ſolitary, and contained in the cup, being of a compreſſed figure, and crowned with briſtly hairs.

ELEPHAS, the ELEPHANT, in zoology. See the article ELEPHANT.

ELEVATION, *elevatio*, the ſame with altitude or height. See ALTITUDE.

Angle of ELEVATION, in gunnery, that comprehended between the horizon and the line of direction of a cannon or mortar; or it is that which the chaſe of a piece, or the axis of its hollow cylinder, makes with the plane of the horizon.

ELEVATION, in architecture, the ſame with an orthographic, or upright draught of a building. See ORTHOGRAPHY.

ELEVATION *of the hoſt*, in the church of

Rome, that part of the maſs where the prieſt raiſes the hoſt above his head for the people to adore. See MASS and HOST.

ELEVATOR, in anatomy, the name of ſeveral muſcles, ſo called from their ſerving to raiſe the parts of the body to which they belong: ſuch are the elevator alæ naſæ, the elevator of the auricle or external ear, the elevator of the epiglottis, of the eye-lids, humerus, lips, urethra, and thoſe of the anus, called alſo levatores. See MUSCLE.

The elevator of the eye-lids is alſo called ſuperbus, as being uſed when people put on a haughty or high look.

ELEVATORY, *elevatorium*, in ſurgery, an inſtrument for raiſing depreſſed or fractured parts of the ſcull, to be applied after the integuments and perioſteum are removed. If there is any hole, the inſtrument muſt be faſtened to it; but if there is none, the ſcrew-end of the inſtrument muſt be applied. See plate LXXXV. fig. 3. n° 1.

But as theſe elevatories are ſo contrived, that, where the neighbouring bones are fractured or depreſſed, they cannot be applied without greatly increaſing the pain, ſurgeons have invented another kind which might be applied with more ſafety, called *tripes*, from the number of its feet. It is near twice as big as the figure we have given of it; (*ibid.* n° 2.) and the feet A A A ſtand nearer or farther from each other, as there is occaſion. The manner of applying it is this: the feet are to be applied to the ſound parts of the head, and the ſcrew B C, by frequently turning its handle D D, will preſently lay hold of the depreſſed part of the cranium, eſpecially if a ſmall hole has been made in it with the point of a ſharp awl. Then upon turning the ſcrew, E E, the trepan is raiſed by degrees, and with it the depreſſed part of the cranium. But if any opening ſhall appear between the fractured parts, it will be proper to take off the pointed end of the inſtrument B, and in its room fix the elevatory G, by the ſcrew H, about the part F of the figure n° 2. by the aſſiſtance of which it will be eaſy to raiſe the depreſſed part. See the manner of applying this inſtrument repreſented *ibid.* n° 3. See the article TREPANNING.

ELEVE, a french term, ſometimes met with in our language, ſignifying a diſciple.

Formerly there were twenty eleves in the academy of ſciences at Paris, and ten in that of inſcriptions; but the term has ſince been changed for an adjunct. See the articles ACADEMY and ADJUNCT.

ELEUSINIA, in grecian antiquity, a feſtival kept in honour of Ceres, every fourth, by ſome ſtates, but by others, every fifth year. The Athenians celebrated it at Eleuſis, a town of Attica, whence the name.

It was celebrated with a world of ceremony, and perſons of both ſexes were initiated in it; being deemed impious to neglect doing ſo. The myſteries were of two ſorts, the leſſer, and the greater; whereof the former were ſacred to Proſerpine, Ceres's daughter, and the latter to Ceres herſelf. According to Lactantius, they conſiſted in a myſtical repreſentation of what mythologiſts teach of Ceres; though ſome of the chriſtian fathers will have the great myſtery, or ſecret, which they were forbidden by law, upon pain of death, to divulge, to have been the repreſentation or figures of both male and female privities, which were handed about and expoſed to the company.

ELEUTHERIA, another feſtival celebrated at Platæa, by delegates from almoſt all the cities of Greece, in honour of Jupiter Eleutherius, or the aſſertor of liberty.

It was inſtituted in memory of the victory obtained by the Grecians, in the territories of Platæa, over Mardonius, the perſian general, left by Xerxes with a mighty army to ſubdue Greece.

ELF, a term, now almoſt obſolete, formerly uſed to denote a fairy, or hobgoblin, an imaginary being, the creature of ignorance, ſuperſtition and craft. See the article FAIRY.

ELF-ARROWS, in natural hiſtory, a name given to the flints, antiently faſhioned into arrow-heads, and ſtill found foſſile in Scotland, America, and ſeveral other parts of the world.

ELGIN, the capital of the county of Murray, in Scotland, ſituated on the river Loſey, about ſix miles north of the Spey: weſt longitude 2° 25′, north latitude 57° 40′.

ELICIT, in ethics, is applied to an act of the will immediately produced by, and of, the will, and received within the ſame: as to be willing, unwilling, loving, hating, &c. Acts of which nature are termed elicit, becauſe that, being before in the power of the will, they are now brought forth into act. But they are ſo far intrinſic, that ſome authors conſider them as the will itſelf, and deny that they ought to be diſtinguiſhed from it any more than light is to be diſtinguiſhed from the ſun.

ELIGENDO VIRIDARIO. See the article VIRIDARIO ELIGENDO.

ELIGIBILITY, in the romiſh canon law, a bull granted by the pope, to certain perſons, to qualify them to be choſen to an office, or dignity, whereof they were before incapable by want of age, birth, or the like.

ELIQUATION, in metallurgy, a ſeparation of the different parts of mixed bodies, by the different degrees of fire required to melt them.

When the nature of ores, or of metallic mixtures, is ſuch, that while one part of them melts in the fire, the other, more refractory and difficult of fuſion, remains ſtill ſolid; the firſt, when the maſs is placed in a mild fire, flows out of the interſtices of the other, and is thus ſeparated from it. The perfection of this operation requires a different fluidity of the parts that conſtitute the maſs. Lead, for inſtance, melts into one maſs with copper, by a ſtrong fire, whereas theſe metals cannot diſſolve each other in a moderate one, but if the maſs compoſed of both theſe, thus blended together, is afterwards expoſed to a mild fire on an inclined plane, the lead alone melts, the copper becoming only brittle and ſpungy, and remaining in its ſolid form, even when the lead has run out of it. This ſeparation, however, is not ſo perfectly made, but that there ever remains ſome lead in the copper, and ſome ſmall part of the copper is alſo carried away with the lead: wherefore, it is neceſſary, for this experiment, that the metals are not mixed in too minute proportions; for if one thouſandth part of lead were to be mixed with copper, or the ſame ſmall proportion of copper with the lead, the ſeparation by eliquation could not be effected.

It is generally neceſſary alſo, to make this operation ſucceed, to add ingredients that are capable either of deſtroying the force by which the different parts cohere together, or of procuring an eaſier flux of the metals: for the mixture of the other metals will not be ſeparated like thoſe of copper and lead, without the admixture of other ſubſtances. For inſtance, gold, ſilver, and copper melted together, and perfectly blended by that means with one another, remain in the ſame ſtate in any degree of fire; to make the eliquation of the gold and ſilver, therefore, out of ſuch a mixture, the ſame additions muſt be uſed as in the operation of precipitation by fuſion.

ELISION, in grammar, the cutting off, or ſuppreſſing a vowel at the end of a word, for the ſake of ſound, or meaſure, the next word beginning with a vowel.

Eliſions are pretty frequently met with in engliſh poetry, but more frequently in the Latin, French, &c. They chiefly conſiſt in ſuppreſſions of the *a*, *e*, and *i*, though an eliſion ſuppreſſes any of the other vowels. In the following example from Virgil there are three eliſions.

Phillida amo ante alias, ------

ELIXATION, in pharmacy, the extracting the virtues of ingredients by boiling or ſtewing. See DECOCTION.

ELIXIR, in medicine, a compound tincture extracted from many efficacious ingredients, Hence the difference between a tincture and an elixir ſeems to be this, that a tincture is drawn from one ingredient, ſometimes with an addition of another to open it, and to diſpoſe it to yield to the menſtruum; whereas an elixir is a tincture extracted from ſeveral ingredients at the ſame time. See the article TINCTURE.

There are a great number of elixirs deſcribed by chemical writers, and in the diſpenſatories, the moſt remarkable of which are prepared as follows.

ELIXIR *of aloes.* Take of the tincture of myrrh a quart; ſaffron, ſoccotrine aloes, of each three ounces. After digeſtion, ſtrain off the ſpirit.

Paregoric ELIXIR. Take flowers of benjamin, and opium, ſtrained, of each a dram; of camphor, two ſcruples; of the eſſential oil of aniſeeds half a dram, or rectified ſpirit of wine a quart. After digeſtion, ſtrain off the ſpirit.

Proprietatis ELIXIR. See the article PROPRIETATIS ELIXIR.

Acid ELIXIR *of vitriol.* Take of the aromatic tincture a pint; of the ſtrong ſpirit, or oil of vitriol, the weight of four ounces; mix them gradually, and when the fæces are ſubſided, filtre thro' paper.

Dulcified ELIXIR *of vitriol.* Take of aromatic tincture a pint; of dulcified ſpirit of vitriol, eight ounces in weight; mix them. This preparation is intended for ſtomachs which cannot bear the acidity of the preceding.

The compound ELIXIR *of myrrh.* Take of the extract of ſavine, one ounce; of the tincture of caſtor, a pint; of the tincture of myrrh, half a pint. After digeſtion, ſtrain off the liquor.

ELK, *alce*, in zoology, an animal of the deer kind, with the horns palmated, and without a ſtem. It is a native of the northern parts of Europe, and is a very large and ſtrong animal; being equal in ſize to a horſe, but much leſs beautiful. See plate LXXXVIII. fig. 2.

Elk's hoofs ſtand recommended for the cure of the epilepſy, but at preſent are only uſed as an ingredient in ſome old compoſitions.

ELKHOLM, a port-town of Gothland, in Sweden, twenty-four miles weſt of Carelſcroon.

ELL, *ulna*, a meaſure of length, different in different countries; but thoſe moſtly uſed in England, are the engliſh and flemiſh ells; whereof the former is three feet nine inches, or one yard and a quarter; and the latter only twenty-ſeven inches, or three quarters of a yard. In Scotland, the ell contains $37\frac{2}{10}$ engliſh inches. See MEASURE.

ELLERENA, a town of Eſtremadura, in Spain, fifty miles ſouth-eaſt of Merida.

ELLIPOMACROSTYLA, in natural hiſtory, a genus of imperfect cryſtals, with ſingle pyramids; one end of their column being affixed to ſome ſolid body. They are dodecahedral, with thinner hexangular columns, and hexangular pyramids. See the article CRYSTAL.

Of theſe cryſtals authors enumerate a great many ſpecies; among which are the whitiſh pellucid ſprig cryſtal, a bright brown kind, a dull brown kind, and a bright yellow kind, all which are farther diſtinguiſhed according to the different lengths of their pyramids.

ELLIPOPACHYSTYLA, in natural hiſtory, a genus of imperfect cryſtals, compoſed of twelve planes, in an hexangular column, terminated by an hexangular pyramid at one end, and irregularly affixed to ſome other body at the other, with ſhorter columns. See the article CRYSTAL.

There are two ſpecies of theſe cryſtals, one ſhort, bright and colourleſs, found in great plenty in New Spain, and other parts of America; the other a ſhort, dull, and duſky brown one, found in Germany and ſometimes in England.

ELLIPSIS, in geometry, a curve line returning into itſelf, and produced from the ſection of a cone by a plane cutting both its ſides, but not parallel to the baſe. See CONIC SECTIONS.

The eaſieſt way of deſcribing this curve, in plano, when the tranſverſe and conjugate axes A B, E D, (plate LXXXVII. fig. 3. n° 1.) are given, is thus: Firſt take the points *F*, *f*, in the tranſverſe axis A B, ſo that the diſtances, C F, C *f*, from the center C, be each equal to $\sqrt{AC - CD}$; or, that the lines F D, *f* D, be each equal to A C. Then, having fixed two pins in the points F, *f*, which are called the foci of the ellipſis, take a thread equal in length to the tranſverſe axis A B; and faſtening its two ends, one to the pin F, and the other to *f*, with another pin M ſtretch the thread tight: then if this pin M be moved round till it returns to the place from whence it firſt ſet out, keeping the thread always extended ſo as to form the triangle F M *f*, it will deſcribe an ellipſis, whoſe axes are A B, D E.

The greater axis, A B, paſſing through the two foci F *f*, is called the tranſverſe axis; and the leſſer one D E, is called the conjugate, or ſecond axis: theſe two always biſect each other at right angles, and the center of the ellipſis is the point C, where they interſect. Any right line paſſing through the center, and terminated by the curve of the ellipſis on each ſide, is called a diameter; and two diameters, which naturally biſect all the parallels to each other, bounded by the ellipſis, are called conjugate diameters. Any right line, not paſſing through the center, but terminated by the ellipſis, and biſected by a diameter, is called the ordinate, or ordinate applicate, to that diameter. And a third proportional to two conjugate diameters, is called the latus rectum, or parameter of that diameter which is the firſt of the three proportionals.

The reaſon of the name is this: let B A, E D, be any two conjugate diameters of an ellipſis (ſee plate LXXXVII. fig. 3. n° 2. where they are the two axes) at the end A, of the diameter A B, raiſe the perpendicular A F, equal to the latus rectum, or parameter, being a third proportional to A B, E D, and draw the right line B F: then if any point P be taken in B A, and an ordinate P M be drawn, cutting B F in N, the rectangle under the abſciſs A P, and the line P N will be equal to the ſquare of the ordinate P M. Hence drawing N O parallel to A B, it appears that this rectangle, or the ſquare of the ordinate, is leſs than that under the abſciſs A P, and the parameter A F, by the rectangle under

der A P and O F, or N O and O F; on account of which deficiency, Apollonius firſt gave this curve the name of an ellipſis, from ελλειπειν, to be deficient.

In every ellipſis, as A E B D, *(ibid.* n° 2.) the ſquares of the ſemi-ordinates M P, *m p*, are as the rectangles under the ſegments of the tranſverſe axis A P × P B, A *p* × *p* B, made by theſe ordinates reſpectively; which holds equally true of the circle, where the ſquares of the ordinates are equal to ſuch rectangles, as being mean proportionals between the ſegments of the diameter. In the ſame manner, the ordinates to any diameter whatever, are as the rectangles under the ſegments of that diameter.

As to the other principal properties of the ellipſis, they may be reduced to the following propoſitions. 1. If from any point M in an ellipſis, two right lines, M F, M *f*, *(ibid.* n° 1,) be drawn to the foci F, *f*, the ſum of theſe two lines will be equal to the tranſverſe axis A B. This is evident from the manner of deſcribing an ellipſis. 2. The ſquare of half the leſſer axis is equal to the rectangle under the ſegments of the greater axis, contained between the foci and its vertices; that is, $DC^2 = AF \times FB = Af + fB$. 3. Every diameter is biſected in the center C. 4. The tranſverſe axis is the greateſt, and the conjugate axis the leaſt, of all diameters. 5. Two diameters, one of which is parallel to the tangent in the vertex of the other, are conjugate diameters; and vice verſa, a right line drawn thro' the vertex of any diameter parallel to its conjugate diameter, touches the ellipſis in that vertex. 6. If four tangents be drawn through the vertices of two conjugate diameters, the parallelogram contained under them will be equal to the parallelogram contained under tangents drawn through the vertices of any other two conjugate diameters. 7. If a right line, touching an ellipſis, meet two conjugate diameters produced, the rectangle under the ſegments of the tangent, between the point of contact and theſe diameters, will be equal to the ſquare of the ſemi-diameter, which is conjugate to that paſſing thro' the point of contact. 8. In every ellipſis, the ſum of the ſquares of any two conjugate diameters, is equal to the ſum of the ſquares of the two axes. 9. In every ellipſis, the angles F G I, *f* G H, *(ibid.* n° 1.) made by the tangent H I, and the lines F G, *f* G, drawn from the foci to the point of contact, are equal to each other. 10. The area of an ellipſis is to the area of a circumſcribed circle, as the leſſer axis is to the greater, and vice verſa, with reſpect to an inſcribed circle; ſo that it is a mean proportional between two circles, having the tranſverſe and conjugate axes for their diameters. This holds equally true of all the other correſponding parts belonging to an ellipſis.

The curve of any ellipſis may be obtained by the following ſeries. Suppoſe the ſemi-tranſverſe axis $CB = r$, the ſemi-conjugate axis $CD = c$, and the ſemi-ordinate $= a$; then the length of the curve

$$MB = a + \frac{r^2 a^3}{6c^4} + \frac{4r^2c^2a^5 - ra^5}{40c^8} + \frac{8c^4r^2a^7 + r^6a^7 - 4c^2r^5a^7}{112c^{12}}, \text{ \&c.}$$

And, if the ſpecies of the ellipſis be determined, this ſeries will be more ſimple: for if $c = 2r$, then

$$MB = a + \frac{a^3}{96r^2} + \frac{3a^5}{2048r^4} + \frac{113a^7}{458752a^6} + \frac{3419a^9}{75497472r^8}, \text{ \&c.}$$

This ſeries, will ſerve for an hyperbola, by making the even parts of all the terms affirmative, and the third, fifth, ſeventh, *&c.* terms negative.

The periphery of an ellipſis, according to Mr. Simpſon, is to that of a circle, whoſe diameter is equal to the tranſverſe axis of the ellipſis, as

$$1 - \frac{d}{2.2} - \frac{3d^2}{2.2.4.4} - \frac{3.3.5d^3}{2.2.4.4.6.6} - \frac{2.3.5.5.7d^4}{2.2.4.4.6.6.8.8}, \text{ \&c.}$$

is to 1, where *d* is equal to the difference of the ſquares of the axes applied to the ſquare of the tranſverſe axis.

Thoſe who deſire to be more particularly informed concerning the properties of the ellipſis, may conſult Simpſon's Conic Sections, and Wolfius's Elements of Mathematics, tom. 1. alſo Maclaurin's Fluxions, Art. 609. ſeq. and the marquis de l'Hoſpital's Sect. Conic. lib. 6.

Infinite ELLIPSIS. See ELLIPTOIDES.

Quadrature of the ELLIPSIS. See the article QUADRATURE.

ELLIPSIS, in grammar, a figure of ſyntax, wherein one or more words are not expreſſed; and from this deficiency, it has got the name ellipſis.

To this figure, beſides the ellipſis properly ſo called, belong appoſition, ſynecdoche, aſyndeton, zeugma, ſyllepſis, and prolepſis. See the articles APPOSITION, SYNECDOCHE, *&c.*

The ellipſis, properly ſo called, is when the deficient word or words muſt be ſupplied from elſewhere; as *Hectoris Andromache*, where *uxor* is underſtood; that is, Andromache Hector's wife.

ELLIPSIS, in rhetoric, a figure nearly allied to preterition, when the orator, through tranſport of paſſion, paſſes over many things; which, had he been cool, ought to have been mentioned.

In preterition, the omiſſion is deſigned; which, in the ellipſis, is owing to the vehemence of the ſpeaker's paſſion, and his tongue not being able to keep pace with the emotion of his mind.

ELLIPTIC, or **ELLIPTICAL**, ſomething belonging to an ellipſis. See ELLIPSIS.

Thus we meet with elliptical compaſſes, elliptic conoid, elliptic ſpace, elliptic ſtairs, *&c.* See the articles COMPASSES, CONOID, *&c.*

The elliptic ſpace is the area contained within the curve of the ellipſis, which is to that of a circle deſcribed on the tranſverſe axis, as the conjugate diameter is to the tranſverſe axis; or it is a mean proportional between two circles, deſcribed on the conjugate and tranſverſe axis.

ELLIPTOIDES, in geometry, a name uſed by ſome to denote infinite ellipſes, defined by the equation $ay^{m+n}=bx^{m}(a-x)^{n}$.

Of theſe there are ſeveral ſorts: thus, if $ay^{3}=bx^{2}(a-x)$ it is a cubical elliptoid; and if $ay^{4}=bx^{2}(a-x)^{2}$, it denotes a biquadratic elliptoid, which is an ellipſis of the third order in reſpect of the appollonian ellipſis.

ELM, *ulmus*, in botany. See ULMUS.

The elm is very ſerviceable in places where it may lie continually dry, or wet in extremes. Accordingly, it is proper for water-works, mills, the ladles and ſoles of the wheel-pipes, pumps, aqueducts, pales, and ſhip-planks beneath the water-lines. It is alſo of uſe for wheelwrights, handles for ſingle ſaws, axle-trees, and the like. The clearneſs of the grain, makes it alſo fit for all kinds of carved works, and moſt ornaments relating to architecture. As to the medicinal uſes of elm, the leaves are aſtringent, and the bark good for aſſuaging the pains of the gout.

ELNA, a town of Catalonia in Spain, but ſubject to France, ſituated ten miles ſouth of Perpignan.

ELOCUTION, in rhetoric, the adapting words and ſentences to the things or ſentiments to be expreſſed. It conſiſts of elegance, compoſition, and dignity. The firſt, comprehending the purity and perſpicuity of a language, is the foundation of elocution. The ſecond ranges the words in proper order; and the laſt adds the ornaments of tropes and figures to give ſtrength and dignity to the whole. See STYLE, PERIOD, FIGURE.

ELOGY, *elogium*, a praiſe or panegyric beſtowed on any perſon or thing, in conſideration of its merit. The beauty of elogy conſiſts in an expreſſive brevity. Elogiums ſhould not have ſo much as one epithet properly ſo called, nor two words ſynonymous. They ſhould ſtrictly adhere to truth; for extravagant and improbable elogies rather leſſen the character of the perſon or thing they would extol.

ELOHIM, **ELOHI**, or **ELOI**, in ſcripture language, one of the names of God. See the article GOD.

Angels, princes, great men, judges, and even falſe gods are ſometimes called by this name. The ſequel of the diſcourſe, Calmet obſerves, is what aſſiſts us in judging rightly concerning the true meaning of this word. It is the ſame as Eloha; one is the ſingular, the other the plural. Nevertheleſs, Elohim is often conſtrued in the ſingular number, particularly when the true God is ſpoken of; but when falſe gods is ſpoken of, it is conſtrued rather in the plural.

ELOINED, in law, ſignifies reſtrained or hindered from doing ſomething: thus it is ſaid, that if thoſe within age be eloined, ſo that they cannot ſue perſonally, their next friends ſhall ſue for them.

ELONGATION, in aſtronomy, the digreſſion or receſs of a planet from the ſun, with reſpect to an eye placed on our earth. The term is chiefly uſed in ſpeaking of Venus and Mercury, the arch of a great circle intercepted between either of theſe planets and the ſun, being called the elongation of that planet from the ſun.

But here it is to be obſerved, that it is only a circle which has the ſun for its center; that the greateſt elongation is in a line touching the planet's orbit. For in an elliptic orbit it may be, that the elongation from the ſun may grow ſtill greater, even after it has left the place where the line joining the earth and planet touches the orbit. For after that, the true diſtance of the planet from the ſun may increaſe, whilſt the diſtance of the ſun and planet from the earth does not increaſe, but rather decreaſe. But, becauſe the orbits of the planets are nearly circular, ſuch ſmall differences may be neglected in aſtronomy. The greateſt elongation of Venus is found by obſervatian to be about forty-eighty degrees, and the greateſt elongation of Mercury about twenty-eight degrees, upon which account this planet is rarely to be ſeen with the naked eye. See the articles PLANET, VENUS, MERCURY, &c.

ELONGATION, is alſo uſed for the difference in motion between the ſwifteſt and the ſloweſt of two planets, or the quantity of ſpace whereby the one has overgone the other.

Angle of **ELONGATION** is an angle contained under lines drawn from the center of the ſun and planet to the center of the earth.

ELONGATION, in ſurgery, is an imperfect luxation, occaſioned by the ſtretching or lengthening of the ligaments of any joint. See the article LUXATION.

ELOPEMENT, in law, is where a married woman departs from her huſband, and cohabits with an adulterer; in which caſe the huſband is not obliged to allow her any alimony out of his eſtate, nor is he chargeable for neceſſaries for her of any kind. However, the bare advertiſing a wiſe in the Gazette, or other public papers, is not a legal notice to perſons in general not to truſt her; tho' a perſonal notice given by the huſband to particular perſons, is ſaid to be good.

An action lies, and large damages may be recovered, againſt a perſon for carrying away and detaining another man's wife.

ELOQUENCE, the art of ſpeaking well, ſo as to affect and perſuade.

Cicero defines it, the art of ſpeaking with copiouſneſs and embelliſhment.

Eloquence and rhetoric differ from each other, as the theory from the practice; rhetoric being the art which deſcribes the rules of eloquence, and eloquence that art which uſes them to advantage. For the moſt part, however, they are uſed indiſcriminately for each other. See the articles RHETORIC, ORATORY, INVENTION, DISPOSITION, EXPRESSION, PRONUNCIATION, ACTION, &c.

ELSIMBURG, a port-town of Sweden, about ſeven miles eaſt of Elſinore.

ELSINORE, a port-town of Denmark, about twenty-two miles north of Copenhagen, and ſituated on the Sound, or the entrance into the Baltic ſea.

ELTZ, a town of lower Saxony, about eleven miles ſouth-weſt of Hildeſheim.

ELVAS, a city and biſhop's ſee of Alentejo, in Portugal, ſituated near the frontiers of ſpaniſh Eſtremadura: weſt long. 7° 35′, and north lat. 38° 45′.

It is one of the ſtrongeſt fortreſſes in Portugal.

ELVELA, in botany, a genus of funguſes ſmooth both on the upper and under ſide.

Micheli calls this genus fungoides and fungoidaſter.

ELUL, in antient chronology, the twelfth month of the jewiſh civil year, and the ſixth of the eccleſiaſtical: it conſiſted of only twenty-nine days, and anſwered pretty nearly to our Auguſt.

ELUTRIATION, in metallurgy, the ſeparating the lighter matters from the mixt ores of metals, by means of great quantities of fair water. Solid bodies not diſſoluble in water, are by this operation ſeparated from each other, by water very well ſtirred, ſo that the lighter and more ſubtile parts are carried away by the water, while the heavier and more ſolid bodies remain at the bottom of the veſſels. Some of the ſtones, earths, and other bodies naturally mixt with the ores of metals, are much lighter than the metalline parts of theſe ores, and are therefore very eaſily ſeparated by elutriation, either by barely pounding and waſhing them, or by previous calcination, and then extinguiſhing them in water, and waſhing them.

The kinds of ores proper for elutriation are known, 1. By the heterogeneous matter, and the ores themſelves being in ſuch large maſſes, as to be very viſible, and eaſily broken and ſeparated by hammers, wedges, &c. 2. By the great ſpecific gravity of the ore, which ſhews us that the metallic maſſes adhere to their matrix in firm ſolid molecules, and are not ſcattered and diſperſed ſparingly through it. 3. From the lightneſs of the ſtony matrix. And, 4. From its brightneſs, whether this properly be naturally inherent in the ſtony matter, or procured by fire in calcination; for in each caſe it renders the comminution of the compound maſs eaſy. In this caſe, however, it is neceſſary that the ore itſelf be of a nature ſufficiently fixed, and that it do not fly off in the roaſting, but only melt into ſolid ſpheroidical molecules. See Cramer's Art. Docim. pars i. § 381, 535.

ELY, a city and biſhop's ſee of Cambridgeſhire, ſituated about twelve miles north of Cambride: eaſt long. 15′, and north lat. 52° 24′.

It is a county of itſelf, including the territory around, and has a judge who determines all cauſes civil and criminal within its limits.

ELYMUS, in botany, a genus of the triandria-digynia claſs of plants, the calyx of which is a common involucrum, conſiſting of four leaves, and containing ſeveral flowers in two ſpiculæ: the particular corollæ are compoſed of two valves: the ſeed is oblong.

ELYSIUM, or ELYSIAN FIELDS, in heathen mythology, certain plains abounding with woods, fountains, verdure, and every delightful object; ſuppoſed to be the habitation of heroes and good men, after death.

According to ſome, the fable of elyſium is of phœnician extraction, or rather founded upon the account of paradiſe delivered in the ſcriptures. As to the ſituation of theſe happy regions, authors are not agreed: Homer makes them the ſame with certain pleaſant meadows near Memphis, on the banks of the acheruſian lake, mentioned by Diodorus Siculus, in his deſcription of the funeral of the Egyptians. Virgil ſeems to place them in Italy, only under-ground: and others in other places. But the generality of authors will have them to be ſituated in the Fortunate Iſlands. See the article FORTUNATE ISLANDS.

ELYTROIDES, or VAGINALIS, in anatomy, the ſecond proper membrane that involves the teſtes. See the article TESTICLE.

EMANATION, the act of flowing or proceeding from ſome ſource or origin; or, the thing that proceeds from that action.

EMANATION, among ſchoolmen, is uſed for the production of a leſſer thing, in order to the production of a greater, by virtue of ſome natural connection or dependance between them: for, as when ſeveral moveables are joined together, the ſame power that moves the firſt, moves all the reſt; as in pulling up the trunk of a tree, you pull up the branches, roots, *&c.* or in drawing one link of a chain, you bring forward all the reſt: the ſame is to be underſtood in all conjunct natural effects, *viz.* that the ſame power whereby the firſt is produced, does alſo produce all the reſt naturally connected to it, in that, by means of the connection the action of the agent is conveyed from the one to the other, ſo that the firſt determines the agent to the production of all the reſt; and hence that is called an emanative cauſe, in contradiſtinction to an efficient cauſe, which produces an effect by its mere preſence, without the intervention of any action.

EMANCIPATION, in the roman law, the ſetting free a ſon from the ſubjection of his father; ſo that whatever moveables he acquires, belong in propriety to him, and not to his father, as before emancipation.

Emancipation put the ſon in capacity of managing his own affairs, and of marrying without his father's conſent, though a minor. Emancipation differs from manumiſſion, as the latter was the act of a maſter in favour of a ſlave, whereas the former was that of a father in favour of his ſon.

There were two kinds of emancipation, the one tacit, which was by the ſon's being promoted to ſome dignity, by his coming of age, or by his marrying, in all which caſes he became his own maſter of courſe.

The other expreſs; where the father declared before a judge, that he emancipated his ſon. In performing this, the father was firſt to ſell his ſon imaginarily to another, whom they called *pater fiduciarius*, father in truſt, of whom being bought back again by the natural father, he manumitted him before the judge, by a verbal declaration. See MANUMISSION.

Emancipation ſtill obtains in France with regard to minors or pupils, who are hereby ſet at liberty to manage their own effects, without the advice or direction of their parents or tutors.

EMARGINATED, among botaniſts, an appellation given to ſuch leaves as have a little indenting on their ſummits: when this indenting is terminated on each ſide by obtuſe points, they are ſaid to be obtuſely emarginated; whereas when theſe points are acute, they are called acutely emarginated.

EMASCULATION, the act of caſtrating or depriving a male of thoſe parts which characterize his ſex. See the article CASTRATION.

EMAUX DE L'ESCU, in heraldry, the metal and colour of the ſhield or eſcutcheon. See the article SHIELD.

EMBALMING, is the opening a dead body, taking out the inteſtines, and filling the place with odoriferous and deſiccative drugs and ſpices, to prevent its putrifying. The Egyptians excelled all other nations in the art of preſerving bodies from corruption; for ſome that they have embalmed upwards of two thouſand years ago, remain whole to this day, and are often brought into other countries as great curioſities. Their manner of embalming was thus: they ſcooped out the brains with an iron ſcoop, out at the noſtrils, and threw in medicaments to fill up the vacuum: they alſo took out the entrails, and having filled the body with myrrh, caſſia, and other ſpices, except frankincenſe, proper to dry up the humours, they pickled it in nitre, where it lay ſoaking for ſeventy days. The body was then wrapped up in bandages of fine linen and gums, to make it ſtick like glue, and ſo was delivered to the kindred of the deceaſed, entire in all its features, the very hairs of the eye-lids being preſerved. They uſed to keep the bodies of their anceſtors, thus embalmed, in little houſes magnificently adorned, and took great pleaſure in beholding them, alive as it were, without any change in their ſize, features, or complexion. The Egyptians alſo embalmed birds, *&c.* The prices for embalming were different; the higheſt was a talent, the next twenty minæ, and ſo decreaſing to a very ſmall matter: but they who had not wherewithal to anſwer this expence, contented themſelves with infuſing, by means of a ſyringe, thro' the fundament, a certain liquor extracted from the cedar, and leaving it there, wrapped up the body in ſalt of nitre: the oil thus preyed upon the inteſtines, ſo that when they took it out, the inteſtines came away with it, dried, and not in the leaſt putrified: the body being incloſed in nitre, grew dry, and nothing remained beſides the ſkin glued upon the bones.

EMBARCADERO, in the ſpaniſh commerce, the port-town of ſome conſiderable inland city; ſuch is Arica to Potoſi. See the articles ARICA and POTOSI.

EMBARGO, in commerce, an arreſt on ſhips, or merchandize, by public authority; or a prohibition of ſtate, commonly on foreign ſhips, in time of war, to prevent their going out of port; ſometimes to prevent their coming in; and ſometimes both, for a limited time.

The king may lay embargoes on ſhips, or employ thoſe of his ſubjects, in time of danger, for ſervice and defence of the nation; but they muſt not be for the private advantage of a particular trader, or company; and therefore a warrant to ſtay a ſingle ſhip is no legal embargo. No inference can be made from embargoes which are only in war-time; and are a prohibition by advice of council, and not at proſecution of parties. If goods be laden on board, and after an embargo, or reſtraint from the prince or ſtate, comes forth, and then the maſter of the ſhip breaks ground, or endeavours to ſail, if any damage accrues, he muſt be reſponſible for the ſame; the reaſon is, becauſe his freight is due, and muſt be paid, nay though the goods be ſeized as contraband.

Embargo differs from quarantine, inſomuch as this laſt is always for the term of forty days, in which perſons from foreign parts infected with the plague, are not permitted to come on ſhore. See the article QUARANTINE.

EMBASSADOR, or AMBASSADOR, a public miniſter ſent from one ſovereign prince, as a repreſentative of his perſon, to another.

Embaſſadors are either ordinary or extraordinary. Embaſſador in ordinary is he who conſtantly reſides in the court of another prince, to maintain a good underſtanding, and look to the intereſt of his maſter. Till about two hundred years ago, embaſſadors in ordinary were not heard of; all, till then, were embaſſadors extraordinary, that is, ſuch as are ſent on ſome particular occaſion, and who retire as ſoon as the affair is diſpatched.

By the law of nations, none under the quality of a ſovereign prince can ſend or receive an embaſſador. At Athens, embaſſadors mounted the pulpit of the public orators, and there opened their commiſſion, acquainting the people with their errand. At Rome, they were introduced to the ſenate, and delivered their commiſſions to them.

Embaſſadors ſhould never attend any public ſolemnities, as marriages, funerals, *&c.* unleſs their maſters have ſome intereſt therein: nor muſt they go into mourning on any occaſions of their own, becauſe they repreſent the perſons of their prince.

By the civil law, the moveable goods of an embaſſador, which are accounted an acceſſion to his perſon, cannot be ſeized on, neither as a pledge, nor for payment of a debt, nor by order or execution of judgment, nor by the king's or ſtate's leave, where he reſides, as ſome conceive; for all actions ought to be far from an embaſſador, as well that which toucheth his neceſſaries, as his perſon: if therefore, he hath contracted any debt, he is to be called upon kindly, and if he refuſes, then letters of requeſt are to go to his maſter. Nor can any of the embaſſador's domeſtic ſervants, that are regiſtered in the ſecretaries of ſtate's office, be arreſted in perſon or goods: if they are, the proceſs ſhall be void, and the parties ſuing out and executing it, ſhall ſuffer and be liable to ſuch penalties and corporal puniſhment as the lord chancellor, or either of the chief juſtices, ſhall think fit to inflict. Yet embaſſadors cannot be defended when they commit any thing againſt that ſtate, or the perſon of the prince, with whom they reſide; and if they are guilty of treaſon, felony, *&c.* or any other crime againſt the law of nations, they loſe the privilege of an embaſſador, and may be ſubject to puniſhment as private aliens.

EMBASSY, the office or function of an embaſſador. See the preceding article.

The rights of embaſſies are, in ſome meaſure, founded on the law of nature, which authorizes all that is neceſſary for procuring and maintaining peace and friendſhip among men. All ſacred and profane hiſtories mention the ſacred rights of embaſſies, and are full of inſtances of wars undertaken for violating them. In the ſcriptures we read of a war made by king David upon the Ammonites on that account. Cicero ſays, that the rights of embaſſies are guarded by all laws both divine and human; wherefore to violate this right, is not only unjuſt, but impious; and for this reaſon, if, for inſtance, whilſt embaſſadors of any nation are reſident with us, war be declared againſt their ſovereigns, they ſtill remain at liberty: thus are embaſſadors ſafe even amidſt the arms of contending foes: and in caſe a baniſhed man is appointed on an embaſſy to the country from whence he is baniſhed, he may not be detained or moleſted there: and, to ſpeak in general, it is an eſtabliſhed cuſtom among all the nations of the world, even barbarians themſelves, to reverence the characters of embaſſadors.

EMBATTLED, in heraldry, the ſame with crenelle. See the article CRENELLE.

EMBDEN, a port-town and city of Germany, capital of a county of the ſame name, now in poſſeſſion of the king of Pruſſia: it is ſituated at the mouth of the river Ems: eaſt long. 6° 45′, and north lat. 53° 40′.

EMBER-WEEKS, or DAYS, in the chriſtian church, are certain ſeaſons of the year, ſet apart for the imploring God's bleſſing, by prayer and faſting, upon the ordinations performed in the church at ſuch times.

Theſe ordination-faſts are obſerved four times in the year, *viz.* the Wedneſday, Friday, and Saturday after the firſt Sunday in lent, after Whit-ſunday, after the fourteenth of September, and the thirteenth of December; it being enjoined, by a canon of the church, that deacons and miniſters be ordained, or made, only upon the ſundays immediately following theſe ember-faſts.

The ember-weeks were formerly obſerved in different churches with ſome variety, but were at laſt ſettled as they are now obſerved, by the council of Placentia, anno 1095. The council of Mentz, convened by Charlemagne, mentions the ember-weeks as a new eſtabliſhment.

EMBERIZA, in ornithology, a genus of birds, the characters of which are, that the beak is of a conic ſhape, each chap whereof is wholly entire at the point; the upper one gapes a little at the baſe from the under, which laſt is inflected, or turned inwards, at the ſides.

To this genus belong the green-finch, bunting, yellow-hammer, *&c.* See the articles GREEN-FINCH, BUNTING, *&c.*

Beſides theſe, the ſchomburger of the ſpaniſh Weſt-Indies ſeems to claim a place among the emberizas: the upper part of the body is of a bright brown colour, ſomewhat inclining to orange, and the whole under part is of a pleaſant light reddiſh brown.

EMBLEM, *εμϐλημα*, a kind of painted enigma, or certain figures painted or cut metaphorically, expreſſing ſome action, with reflections underneath, which, in ſome meaſure, explain the ſenſe of the device, and, at the ſame time, inſtruct us in ſome moral truth, or other matter of knowledge. The emblem is ſomewhat plainer than the enigma, and the invention is more modern, it being entirely unknown to the antients. P. Bouhours has a long and accurate diſſertation upon emblems, wherein he has preciſely defined their nature, laid down rules for their compoſition, and for diſtinguiſhing the true from the falſe.

The Greeks gave this name to inlaid or moſaic work, and even to all kinds of ornaments of vaſes, garments, *&c.* and the Latins uſed emblem in the ſame ſenſe.

EMBLEMATICAL, ſomething belonging to an emblem. See the preceding article.

EMBLEMENTS, among lawyers, denote the profits of ſown lands; but are ſometimes uſed, more largely, for any products that naturally ariſe from the ground.

If a tenant for life ſow the land, and afterwards dies, his executors ſhall have the emblements, and not the perſon in reverſion. The caſe is otherwiſe with reſpect to a tenant for years; for if he ſow the land, and his term expires before he has reaped them, the leſſor, or he in reverſion, is entitled to the emblements. Again, if a perſon deviſes ſown lands by will, and dies before ſeverance, the deviſee ſhall have the emblements, provided no exception was made of corn.

EMBOLISMIC, or INTERCALARY, a term uſed by chronologiſts in ſpeaking of the additional months and years, which they inſert to bring the lunar to the ſolar year. Since the common lunar year conſiſts of twelve ſynodic months, or 354 days nearly, and the ſolar conſiſts of 365 days (throwing away the odd hours and minutes) it is plain that the ſolar year will exceed the lunar by about 11 days; and conſequently in the ſpace of about 33 years the beginning of the lunar year will be carried through all the ſeaſons, and hence it is called the moveable lunar year. This form of the year is uſed at this time by the Turks and Arabians; and becauſe in three year's time, the ſolar year exceeds the lunar by 33 days, therefore, to keep the lunar months in the ſame ſeaſons and times of the ſolar year, or near it, chronologiſts added a whole month to the lunar year every third year, and ſo made it conſiſt of 13 months; this year they called the emboliſmic year, and the additional month the emboliſmic, or embolimean, or intercalary month. This form of the year is called the fixed lunar year, and it was uſed by the Greeks and Romans till the time of Julius Cæſar. See the articles INTERCALARY, YEAR, *&c.*

EMBOLUS, the moveable part of a pump, or ſyringe, called alſo the piſton, or ſucker. See the articles PISTON, PUMP, SYRINGE, *&c.*

EMBOSSING, or IMBOSSING, in architecture and ſculpture, the forming or faſhioning works in relievo, whether cut with a chiſſel, or otherwiſe.

Emboſſing is a kind of ſculpture, wherein the figures ſtick out from the plane whereon it is cut; and according as the figures are more or leſs prominent, they are ſaid to be in alto, mezzo, or baſſo relievo; or high, mean, or low relief. See the article ENCHASING.

EMBRACE *the volt*, in the manege. A horſe is ſaid to embrace a volt, when, working upon volts, he makes a good way every time with his fore-legs.

EMBRACEOR, among lawyers, a perſon, who, having received a reward ſo to do, comes to the bar with one of the parties, and ſpeaks in the caſe; or privily labours the jury, or ſtands in court to overlook them, whereby they are awed or put in fear. Actions of this kind will be embracery, whether the jurors give verdict on the ſide of the party or not. The penalty of this offence is 20 l. and impriſonment of the party at the diſcretion of the court: and may be proſecuted either by indictment at common law, as well as by action on the ſtatute. But attorneys and other lawyers are excepted.

EMBRASURE, in architecture, the enlargement made of the aperture of a door or window, on the inſide of the wall; its uſe being to give the greater play for the opening of the door, or caſement, or to admit the more light. When the wall is very thick, they ſometimes make embraſures on the outſide.

EMBRASURE, in fortification, a hole or aperture in a parapet, through which the cannon are pointed, to fire into the moat or field.

Embraſures are generally twelve feet diſtant from one another, every one of them being from ſix to ſeven feet wide without, and about three within: their height above the platform is three feet on that ſide towards the town, and a foot and a half on the other ſide towards the field; ſo that the muzzle may be ſunk on occaſion, and the piece brought to ſhoot low.

EMBROCATION, in ſurgery and pharmacy, an external kind of remedy, which conſiſts in an irrigation of the part affected, with ſome proper liquor, as oils, ſpirits, *&c.* by means of a woollen or linen cloth, or a ſpunge, dipped in the ſame.

The uſe of embrocation is either to attenuate and diſlodge ſomething obſtructed underneath the ſkin, to eaſe pains, or to irritate the part into more warmth and a quicker ſenſe of feeling.

The pumping uſed in natural baths is properly an embrocation.

EMBROIDERY, a work in gold, or ſilver, or ſilk-thread, wrought by the needle upon cloth, ſtuffs, or muſlin, into various figures. In embroidering ſtuffs, the work is performed in a kind of loom, becauſe the more the piece is ſtretched, the eaſier it is worked. As to muſlin, they ſpread it upon a pattern ready deſigned; and ſometimes, before it is ſtretched upon the pattern, it is ſtarched, to make it more eaſy to handle. Embroidery on the loom is leſs tedious than the other, in which while they work flowers, all the threads of the muſlin, both lengthwiſe and breadthwiſe, muſt be continually counted; but on the other hand this laſt is much richer in points, and ſuſceptible of greater variety. Cloths too much milled are ſcarce ſuſceptible of this ornament, and in effect we ſeldom ſee them embroidered. The thinneſt muſlins are the beſt for this purpoſe, and they are embroidered to the greateſt perfection in Saxony: in other parts of Enrope, however, they embroider very prettily, and eſpecially in France.

There are ſeveral kinds of embroidery, as, 1. Embroidery on the ſtamp, where the figures are raiſed and rounded, having cotton or parchment put under them to ſupport them. 2. Low embroidery, where the gold and ſilver lie low upon the ſketch, and are ſtitched with ſilk of the ſame colour. 3. Guimped embroidery: this is performed either in gold or ſilver; they firſt make a ſketch upon the cloth, then put on cut vellum, and afterwards ſew on the gold and ſilver with ſilk-thread: in this kind of embroidery they often put gold and ſilver cord, tinſel, and ſpangles. 4. Embroidery on both ſides; that which appears on both ſides of the ſtuff. 5. Plain embroidery, where the figures are flat and even, without cords, ſpangles, or other ornaments.

EMBRUN, or AMBRUN, a city of Dauphiny, in France, near the confines of Piedmont: eaſt long. 6° 6′, and north lat. 44° 35′.

EMBRYO, in phyſiology, the firſt rudiments of an animal in the womb, before the ſeveral members are diſtinctly formed; after which period it is denominated a fœtus. See the articles CONCEPTION, GENERATION, and FOETUS.

EMBRYO SULPHUR, *embryonatum ſulphur*, that united with metals or other mineral ſubſtances. See SULPHUR.

EMBRYO-WORMS, thoſe contained in the bodies of viviparous two-winged flies, in ſurprizing multitudes. See the articles FLY and WORM.

EMBRYOTHLASTES, in midwifery, an inſtrument contrived for breaking the bones, for the more eaſy extraction of the fœtus, in difficult labours. See the article DELIVERY.

EMBRYOTOMY, the cutting a fœtus to pieces whilſt in the womb, practiſed in caſes of neceſſity, when there is no other way of ſaving the mother.

EMBRYULCUS, a hook for extracting the child in difficult labours. See plate LXVIII. fig. 2. where nº 1. repreſents the broad ſteel-hook of Palſynus, for extracting a live-infant without danger, when its head ſticks in the vagina. It is neceſſary to have two of them, that one may be applied to each ſide of the head. Nº 2. is the hook commonly uſed for extracting dead fœtuſes. See the article DELIVERY.

EMENDALS, in the accounts of the Inner-temple ſociety, at London, where ſo much *in emendals*, at the foot of an account, ſignifies ſo much money in the bank, or ſtock of the houſe, for repairing loſſes, and to ſupply other emergencies.

EMENDATIO PANIS, *&c.* in law. See the article ASSIZE.

EMERALD, *ſmaragdus*, in natural hiſtory, a genus of precious ſtones, of a green colour, and next in hardneſs to the ruby.

Our jewellers diſtinguiſh emeralds into two kinds, the oriental and occidental: the emeralds of the Eaſt-Indies are evidently finer than thoſe of any other part of the world; but our jewellers, ſeldom meeting with theſe, call the american emeralds the oriental, and uſually ſell cryſtal accidentally tinged with green, under the name of the occidental emerald: theſe being alſo the moſt common, there has grown an opinion among the lapidaries, that the emerald is no harder than the cryſtal; becauſe what they take to be emeralds, are in general only cryſtals.

The genuine emerald, in its moſt perfect ſtate, is, perhaps, the moſt beautiful of all the gems: it is found of various ſizes, but uſually ſmall; a great number of them are met with of about the ſixteenth part of an inch in diameter, and they are found from this to the ſize of a walnut. We have accounts of very large ſizes among the antients, but they are certainly erroneous, the ſtones not being emeralds, but jaſpers or other green ſtones: the larger ſpecimens are at preſent very ſcarce, and are of conſiderable value, tho' much more ſo, when of the Eaſt or Weſt-indies. The emerald is of different figures like the diamond and many of the other gems, being ſometimes found in a roundiſh or pebble-like form, but much more frequently in a columnar one, reſembling common cryſtal: the pebble-emeralds are always the hardeſt and brighteſt, but are ſeldom found exceeding the ſize of a pea: the cryſtalliform ones grow ſeveral together, and are often larger: the pebble-kind are found looſe in the earths of mountains, and ſands of rivers; the columnar are found uſually bedded in, or adhering to, a white, opake, and coarſe cryſtalline maſs, and ſometimes to the jaſper, or the praſius.

The oriental emerald is of the hardneſs of the ſapphire and ruby, and is ſecond only to the diamond in luſtre and brightneſs: the american is of the hardneſs of the garnet, and the european ſomewhat ſofter than that, yet conſiderably harder than cryſtal: but the coloured cryſtals, uſually ſold under the name of emeralds, have much debaſed the credit of this gem. It loſes its colour in the fire, and becomes undiſtinguiſhable from the white ſapphire.

The oriental emeralds are very ſcarce, and at preſent found only in the kingdom of Cambay; very few of them have of late been imported into Europe, inſomuch that it has been ſuppoſed there were no oriental emeralds; but within theſe few years, ſome have been brought from Cambay into Italy, that greatly excel the american ones. The american, being what our jewellers call oriental emeralds, are found principally about Peru; and the european, are principally from Sileſia.

The medicinal virtues aſcribed to this ſtone, are, that it ſtops hæmorrhages and diarrhœas, and ſweetens or obtunds the too acrid humours.

To counterfeit Emeralds. Take of natural cryſtal, four ounces; of red-lead, four ounces; verdigreaſe, forty-eight grains; crocus martis, prepared with vinegar, eight grains; let the whole be finely pulverized and ſifted; put this into a crucible, leaving one inch empty; lute it well, and put it into a potter's furnace, and let it ſtand there as long as they do their pots. When cold, break the crucible, and you will find a matter of a fine emerald-colour, which, after it is cut and ſet in gold, will ſurpaſs in beauty an oriental emerald.

EMERGENT YEAR, in chronology, the epocha, or date, whence any æra, or method of reckoning time, commences: ſuch is the year of the creation of the world, of the birth of our Saviour, &c. See the article Epocha.

EMERSION, in aſtronomy, is when any planet that is eclipſed begins to emerge or get out of the ſhadow of the eclipſing body.

It is alſo uſed when a ſtar, before hid by the ſun as being too near him, begins to re-appear or emerge out of his rays.

Scruples of Emersion, an arch of the moon's orbit, which the moon's center paſſes over from the time ſhe begins to emerge out of the ſhadow of the earth, to the end of the eclipſe. See the article Eclipse.

EMERY, in natural hiſtory, a rich iron-ore found in large maſſes of no determinate ſhape, or ſize, extremely hard, and very heavy. It is uſually of a duſky browniſh-red on the ſurface, but when broken, is of a fine, bright, iron-grey, but not without ſome tinge of redneſs, and is ſpangled all over with ſhining ſpecks, which are ſmall flakes of a foliaceous talc, highly impregnated with iron. It is alſo ſometimes very red, and then uſually contains veins of gold. It makes no efferveſcence with any of the acid menſtruums, and is found in the iſland of Guernſey, in Tuſcany, and many parts of Germany.

Emery is ſaid to have a corroding and almoſt cauſtic quality, but this without any juſt foundation. It is recommended by the antients as an aſtringent and dentifrice. In this laſt intention, however, it muſt be uſed with great caution, as its hardneſs and ſharpneſs will be apt to wear off the enamel of the teeth.

Emery is prepared by grinding in mills, and the powder is ſeparated into parcels of different degrees of fineneſs by waſhing; theſe are called the firſt, ſecond, and third ſort; the firſt being that which remains longeſt ſuſpended in water, the others, ſuch as ſink ſooner from the ſame liquor, and from which it is poured, while yet turbid, to ſettle for the finer kind. Theſe ſeveral ſorts are of great uſe to various artificers in poliſhing and burniſhing iron and ſteel works, marble, cutting and ſcolloping glaſs, &c. The lapidaries cut the ordinary gems on their wheels, by ſprinkling the wetted powder over them, the wheels they uſe being uſually of lead, with a ſmall admixture of pewter, that their ſoftneſs may admit the emery the better. It will not cut diamonds.

The red emery of Peru is in great eſteem with thoſe who ſeek after the philoſopher's ſtone: but the king of Spain ſuffers none of it to be exported.

Putty of **EMERY**, a kind of dirty matter found on the lapidaries wheels, containing part of the powder of emery.

EMETIC, a medicine which induces vomiting. Emetics and purges are ſo much alike in their operations, that one cannot be well apprehended without the other. Thus much, therefore, is common to them both, that any medicine which ſo far vellicates the membranes and coats of the ſtomach and bowels as to draw them into convulſive twitches, or much accelerate their natural motions, will be emetic or cathartic, and ſometimes both. But the action of vomiting is more properly a convulſive motion in the ſtomach than in the bowels. Whatſoever, therefore, ſo irritates the fibres of the ſtomach as to make them contract with great force, will throw its contents upwards, the vent being much larger that way than through the pylorus, which would ſend them down by ſtool. The difference, therefore, between an emetic and a cathartic, lies only in this, that the latter conſiſts of ſuch particles as paſs the ſtomach without any violent vellications of the fibres, and the former, of ſuch as have that effect almoſt as ſoon as they come there, ſo that an emetic ſeems ſtronger than a cathartic; and this is the reaſon why a cathartic in an increaſed doſe will prove emetic. Some are of opinion, that the ſubſtance itſelf which procures a vomit, is thrown up again in the firſt or ſecond ejection; and that the following ſolicitations are cauſed by the acrimony of the juices which the firſt motions pumped, as it were, and occaſioned to drain into the ſtomach. Be that as it will, it is certain that the action of vomiting, gives the ſtrongeſt ſhakes to all the muſcles and ſolids of the body that any motion can give; and that the laſt reachings generally diſcover a drain of humours derived into the ſtomach from ſome conſiderable diſtance. The ſervice to be expected from emetics, is not ſo much, therefore, what they diſcharge upwards, as what their violent emotions and concuſſions render fit for ſeparation, and force through the ſkin and other outlets.

Tinctures, extracts, and reſins, are always obſerved to operate rougher this way than more ſimple preparations; and the reaſon ſeems to be, that ſuch management of an ingredient, divides its parts too much, and makes them come too intimately into contact with the fibres; whence they are not ſo ſoon ſhaken off by their convulſive twitchings, as more groſs parts might be. Upon this account, therefore, moſt of the ſimples which come under this head, are beſt ordered in their natural forms; and the elaborate preparations of the chemical pharmacy eſpecially, produce no emetic ſo good as we find amongſt nature's own productions.

Sydenham lays it down as a rule, that whenever a vomit and bleeding are neceſſary, bleeding ſhould always precede the exhibition of an emetic. Dr. Harris informs us, that antimonial vomits are very ſafe in the heat of the ſummer, but are very dangerous in the cold of the winter. When emetics are too violent, common ſalt is uſed to check their operation. Mild aromatics and opiates alſo have the ſame effect, and corroborating medicines whether taken internally, or applied by way of cataplaſm to the region of the ſtomach. The infuſion of ipecacuanha in wine, according to Dr. Shaw, is the moſt ſafe, gentle, and agreeable emetic hitherto known; whence, ſays he, it may in moſt caſes be properly ſubſtituted for the vinum benedictum, the tartarum emeticum, and all the other antimonial emetics, which are attended with ſome degree of virulency and uncertainty in their operation.

EMETIC TARTAR.	See	TARTAR.
EMETIC POWDER.		ALGAROT.
EMETIC WINE.		VINUM.

EMEU, in ornithology, the ſame with the caſſowary. See CASSOWARY.

EMINENCE, a title of honour peculiar to cardinals. See the article CARDINAL.

EMINENCE, in the military art, a high or riſing ground, which overlooks and commands the low places about it: ſuch places within cannon-ſhot of a fort, are a great diſadvantage; for if the beſiegers become maſters of them, they can, from thence, fire into the fort.

EMINENTIAL EQUATION, an artificial equation, containing another equation eminently: it is ſometimes uſed in the inveſtigation of the areas of curvelined figures. See EQUATION.

EMINENTLY, *eminenter*, a term uſed in the ſchools in regard to things which poſſeſs ſome quality or virtue in a high degree.

EMIR, a title of dignity among the Turks, ſignifying a prince.

This title was firſt given to the caliphs, but when they aſſumed the title of ſultans, that of emir remained to their children, as that of Cæſar among the Romans. At length the title became attributed to all who were judged to deſcend from Mahomet by his daughter Fatimah, and who wear the green turban inſtead of the white. The Turks make an obſervation, that the emirs, before their fortieth year, are men of the greateſt gravity, learning, and wiſdom; but after this, if they are not great fools, they diſcover ſome ſigns of levity and ſtupidity. This is interpreted by the Turks as a ſort of divine impulſe in token of their birth and ſanctity. The Turks alſo call the viziers, baſhaws, or governors of provinces, by this name.

EMISSARY, in a political ſenſe, a perſon employed by another to ſound the opinions of people, ſpread certain reports, or act as a ſpy over other people's actions. See the article SPY.

EMISSARY VESSELS, in anatomy, the ſame with thoſe more commonly called excretory. See the article EXCRETORY.

EMISSION, in medicine, a term uſed chiefly to denote the ejaculation of the ſemen, or ſeed, in the act of coition. See COITION and GENERATION.

EMMENAGOGUES, in pharmacy, medicines which promote the menſes, or monthly courſes, either by giving a greater force to the blood in its circulation, whereby its momentum againſt the veſſels is increaſed; or by making it thinner, whereby it will more eaſily paſs through any outlet. The former intention is helped by chalybeates, and other ſubſtances of the like gravity and elaſticity: and this is the caſe of a leuco-phlegmatic habit, or the green ſickneſs, and its cure: but in the latter caſe, where the blood is florid and too high, attenuating alteratives and detergents are the only remedies, becauſe they are fitteſt to carry the blood through theſe little apertures deſtined for its diſcharge into the uterus.

Obſtructions are removed by the five aperient roots, birthwort, rhubarb, bryony, and wall-flowers, eſpecially if exhibited by way of decoction with ſome ſtimulus of the ſaline kind, ſuch as borax.

EMMERIC, a city of Weſtphalia, in Germany, ſubject to Pruſſia: eaſt long. 5° 45′, north lat. 51° 48′.

EMOLLIENTS, in medicine and pharmacy, are ſuch remedies as ſheath and ſoften the aſperity of the humours, and relax and ſupple the ſolids at the ſame time. It is very eaſy to conceive how both theſe are brought about by the ſame medicine. By what means ſoever, whether in the ſtomach or any other parts, the juices have obtained a ſharpneſs and aſperity, ſo as to vellicate and render uneaſy the fibres and nervous parts, which often happens, thoſe things that are ſmooth, ſoft, and yielding, cannot but wrap up their points, and render them imperceptible, whence they may gradually, by the proper courſe of circulation, be brought to ſome convenient emunctory, without doing any injury by the way. Such parts likewiſe draw the fibres into ſpaſms, keeping them too tenſe, and thereby frequently occaſion obſtructions of the worſt kind. In all ſuch caſes, emollients lubricate and moiſten the fibres, ſo as to relax them into their proper dimenſions, whereupon ſuch diſorders ceaſe.

The chief of the emollient and ſoftening remedies, are the roots of marſh-mallow, of white lilies, of liquorice, and of viper's graſs; the five emollient herbs, lettice, bear's breech, pellitory of the wall, the flowers of elder, of melilot, of mallows, of mullein, of yarrow, of chamæmile, of white lilies, of borrage, of the wild popy, of the lime tree, of the egyptian thorn, of violets, and, moſt of all, ſaffron; the ſeeds of flax, of fenugreek, of aniſe, of quinces, of fleabane, of white poppies; of the four greater and leſſer cold-ſeeds, the ſiliqua, ſweet almonds, figs, pine-nuts, piſtaches, cherry-tree gum, gum arabic, gum tragacanth, ſhavings and jelly of hartſhorn, human greaſe, that of a dog, of a capon, the marrows of their bones, the fat about their omentum, bones, and meſentery; the native oils of animals, freſh butter, cream, milk itſelf, cryſtals of milk, ſperma ceti, honey, the yolk of an egg, and its white dried and reduced to a powder. Of the prepared medicines, oil of ſweet almonds, linſeed-oil, rape-oil, oil of the male balſam apple, decoctions of hartſhorn and viper's graſs, mixed with the juice of citrons, the ptiſan, ſweet whey, Fernelius's ſyrup of marſh-mallows, ointment of marſh-mallows, ſimple diachylon plaſter,

ſter, that of melilot, and that of frog's ſpawn. See EPICERASTICS.

EMPALEMENT, an antient kind of puniſhment, which conſiſted in thruſting a ſtake up the fundament.

EMPALEMENT *of a flower*, among herbaliſts, the ſame with calyx. See CALYX.

EMPANELLING, or IMPANELLING, in law. See the article IMPANELLING.

EMPARLANCE, or IMPARLANCE, in law. See the article IMPARLANCE.

EMPASTING, or IMPASTING, in painting, is the laying on of colours thick and bold; or the applying ſeveral lays of colours, ſo as they may appear thick.

The term is alſo uſed when the colours are laid diſtinct and aſunder, and not ſoftened or loſt in each other. See the article COLOURING.

EMPERESS, or EMPRESS, denotes either the wife of an emperor, or a woman who governs ſingly an empire, in her own right. See EMPEROR and EMPIRE.

EMPEROR, *imperator*, a title of honour among the antient Romans, conferred on a general who had been victorious, and now made to ſignify a ſovereign prince, or ſupreme ruler of an empire.

The title of emperor adds nothing to the rights of ſovereignty; it only gives preheminence above other ſovereigns. The emperors, however, pretend, that the imperial dignity is more eminent than the regal. It is diſputed whether emperors have the power of diſpoſing of the regal title; however this may be, they have ſometimes taken upon them to erect kingdoms: thus it is that Bohemia, Pruſſia, and Poland, are ſaid to have been raiſed to that dignity. In the Eaſt, the title of emperor is more frequent than with us; thus the ſovereign princes of China, Mogul, &c. are called emperors. In the Weſt, the title has been a long time reſtrained to the emperors of Germany. The firſt who bore it was Charlemagne, who was crowned by pope Leo III. in 800. And it is to be obſerved, that there was not a foot of land or territory annexed to the emperor's title.

In the year 1723, the czar of Muſcovy aſſumed the title of emperor of all the Ruſſia's. The kings of France were alſo called emperors, when they reigned with their ſons, whom they aſſociated in the crown: thus Hugh Capet was called emperor, and his ſon Robert, king. The kings of England were antiently ſtiled emperors, as appears from a charter of king Edgar.

The emperor of Germany is a limited monarch in regard to the empire, though he is an abſolute ſovereign in moſt of his hereditary dominions; the late emperors of the auſtrian family, having hereditary dominions, enumerated all of them in their title. Charles VI. was ſtiled emperor of the Romans, always auguſt, king of Bohemia and Hungary, archduke of Auſtria, &c. but the preſent empreſs inheriting thoſe countries, her conſort enjoys only the title of emperor of the Romans, duke of Lorrain and Tuſcany. The emperor creates dukes, marquiſſes, and other noblemen; and he appoints moſt of the officers, civil and military, in the empire: he is elected by the nine electors; and he ſummons the general diet of the empire. See ELECTOR and DIET.

The emperor of Ruſſia is an abſolute hereditary monarch.

EMPETRUM, BERRY-BEARING-HEATH, in botany, a genus of the trioecia-polygamia claſs of plants, the flower of which conſiſts of three petals, of an oval-oblong figure: the ſtamina are three very long capillary filaments: the fruit is a globoſe, depreſſed, and unilocular berry, containing nine ſeeds, gibbous on one ſide, and angulated on the other.

EMPHASIS, in rhetoric, a particular ſtreſs of the voice and action, laid on ſuch parts or words of the oration, as the orator wants to enforce upon his audience. See the article ACCENT.

EMPHEREPYRA, in mineralogy, a genus of ſiderochita, compoſed of various coats ſurrounding a nucleus of the ſame ſubſtance and ſtructure with themſelves. See the article SIDEROCHITA.

Of this genus there are ſeveral ſpecies, diſtinguiſhed by the different colours of their coats or cruſts, as brown, yellow, purple, green, white, &c.

EMPHRACTICS, in medicine and pharmacy, obſtructing topics, ſuch as, when applied to the body, adhere and ſtop the pores.

EMPHYSEMA, in ſurgery, a windy tumour generally occaſioned in a fracture of the ribs, and formed by the air inſinuating itſelf, by a ſmall wound, between the ſkin and muſcles, into the ſubſtance of the cellular or adipoſe membrane, ſpreading itſelf afterwards up to the neck, head, belly, and other parts, much after the manner in which butchers blow up their veal. See the articles FRACTURE and RIBS.

When an emphyſema happens, it will be very proper to enlarge the opening in the ſkin, when too narrow, with the ſcalpel, and to bring down the tumour with frictions and bandage; carrying the compreſſion gradually towards the opening, ſo as to expel the included air by degrees.

Emphyſema, in Hippocrates, imports an inflation of the belly, and ſometimes a tumour in general. It is ſurpriſing to what degree the cellular membrane will be inflated by the air retained and rarefied in its cells. To this purpoſe Mr. Mery gives a very remarkable hiſtory in the memoirs of the royal academy of ſciences for 1713, which the curious may conſult.

EMPHYTEUSIS, in the civil and canon law, the letting out of poor barren lands for ever, or, at leaſt, for a long term of years, on condition of the tenant's cultivating, meliorating, or mending them, and paying a certain yearly conſideration. Emphyteuſes are a kind of alienations, differing from ſale, in that they only transfer the *dominium utile*, the benefits of the ground, not the property, or ſimple fee. Among the Romans, they were at firſt temporary, afterwards perpetual.

EMPIRE, *imperium*, in political geography, a large extent of land, under the juriſdiction or government of an emperor. See the article EMPEROR.

The moſt antient empire we read of, is that of the Aſſyrian, which was ſubverted though the effeminacy of Sardanapalus; the perſian empire was deſtroyed through the bad conduct of Darius Codomannus; the grecian empire, by its being diſmembered among the captains of Alexander the great; and the roman empire, through the ill management of the laſt emperors of Rome.

Empire, or the empire, uſed abſolutely, and without any addition, ſignifies the empire of Germany, called alſo in juridical acts and laws, the holy roman empire. Authors are at a loſs under what form of government to range the empire: ſome will have it a monarchical ſtate, by reaſon all the members thereof are forced to aſk the inveſtiture of their ſtates of the emperor, and to take an oath of fidelity to him. Others will have it an ariſtocratic ſtate, by reaſon the emperor cannot determine any thing without the concurrence of the princes: and, laſtly, others will have the empire to be a monarcho-ariſtocratic ſtate. See ELECTOR, DIET, CIRCLE, &c.

EMPIRIC, an appellation given to thoſe phyſicians who conduct themſelves wholly by their own experience, without ſtudying phyſic in a regular way. Some even uſe the term, in a ſtill worſe ſenſe, for a quack who preſcribes at random, without being at all acquainted with the principles of the art.

EMPLASTER, *emplaſtrum*, in pharmacy, the ſame with plaſter. See PLASTER.

EMPLASTICS, the ſame with emphractics. See the article EMPHRACTICS.

EMPRESS, or EMPERESS. See the article EMPERESS.

EMPROSTHOTONOS, a ſpecies of convulſion, wherein the chin preſſes againſt the breaſt. See CONVULSION.

EMPYEMA, in medicine, a diſorder wherein purulent matter is contained in the thorax or breaſt, after an inflammation and ſuppuration of the lungs and pleura; which, if it be not timely diſcharged, not only obſtructs reſpiration, but alſo returning into the blood occaſions a continual hectic, with a conſumption of the whole body, and other bad ſymptoms.

In order to diſcharge this matter, or blood extravaſated into the cavity of the thorax, in wounds of that part, it muſt be perforated; which operation is called paracenteſis. See PARACENTESIS.

After the affected ſide is opened, the pus muſt be drawn off ſlowly, and at ſeveral times; and the cavity is to be cleanſed by injections of decoctions with honey: which done, the wound is to be healed, giving at the ſame time plenty of vulnerary decoctions inwardly, of ſuch things as deterge and reſiſt putrefaction. See the article ANTISCEPTICS.

EMPYREUM, a term uſed by divines for the higheſt heaven, where the bleſſed enjoy the beatific viſion.

Some of the fathers ſuppoſe the empyreum to have been created before the heavens which we behold. See HEAVEN.

EMPYREUMA, among chemiſts and phyſicians, the fiery taſte or offenſive ſmell which brandies, and other bodies prepared by fire, are impregnated with. See DISTILLATION and BRANDY.

EMRODS, or HÆMORRHOIDS. See the article HÆMORRHOIDS.

EMULGENT, or RENAL ARTERIES, thoſe which ſupply the kidneys with blood; being ſometimes ſingle, ſometimes double on each ſide. See ARTERY.

EMULSION, in pharmacy, a ſoft liquid remedy, of a colour and conſiſtence reſembling milk. It is compoſed by drawing out the oily or milky part of ſeeds or kernels by contuſion, with proper liquors. Emulſions, if carefully made, are a very neat form, but a very ſmall part of the materia medica is reducible thereinto, or only thoſe ſeeds which yield a ſoft milky juice; and therefore the only intention which this form can properly be preſcribed for, is that of an emollient, tho' ſome few are given for other purpoſes, but they are not ſo ſuitable: oils, likewiſe, may, by the help of an egg, and a little of any of the turpentine balſams, be reduced under this head, and, if well managed, will make an elegant medicine. In all emulſions the ſeeds are to be huſked or blanched, and beat in the mortar to a paſte: then the liquors ordered are to be put in by a little at a time at firſt, and beat with the maſs, ſo that the whole pulp may be waſhed out, and nothing but a little like chaff be left behind: this is always to be done in a marble mortar, and with a wooden peſtle.

EMUNCTORY, in anatomy, a general term for all thoſe parts which ſerve to carry off the excrementitious parts of the blood and other humours of the body. Such more eſpecially are the kidneys, bladder, and moſt of the glands. See the articles KIDNEYS, BLADDER, &c.

ENÆMON, εναιμων, in medicine, an epithet often applied by Hippocrates and Galen, to ſuch topical medicines as are appropriated to a wound newly inflicted, before the blood be ſtopped.

ENÆOREMA, in medicine, that pendulous ſubſtance which floats in the urine. It is alſo called ſublimamentum and nubeculæ, from its reſemblance to little clouds. See the article URINE.

ENALLAGE, in grammar, is when one word is ſubſtituted for another of the ſame part of ſpeech: a ſubſtantive for an adjective, as *exercitus victor*, for *victorioſus*; *ſcelus*, for *ſceleſtus*: a primitive for a derivative, as *dardana arma*, for *dardania*; *laticem lyæum*, for *lyæium*: an active for a paſſive, as *nox humida cælo præcipitat*, for *præcipitatur*, &c.

ENALLAGE, in rhetoric, is a figure whereby the diſcourſe is changed and reverſed contrary to all the rules of the language; but this is not done altogether at pleaſure, or without reaſon.

ENALURON, in heraldry, is, according to Guillim, a bordure charged with birds; though others will have it to ſignify, in orle, or form of a bordure. See the article BORDURE.

ENAMEL, a kind of coloured glaſs, uſed in enamelling and painting in enamel. Enamels have for their baſis a pure cryſtal glaſs or frit, ground up with a fine calx of lead and tin prepared for the purpoſe, with the addition uſually of white ſalt of tartar. Theſe ingredients baked together, are the matter of all enamels, which are made by adding colours of this or that kind in powder to this matter, and melting or incorporating them together in a furnace.

For white enamel, Neri De Arte Vitriar, directs only manganeſe to be added to the matter which conſtitutes the baſis. For azure, zaffer mixed with calx of braſs. For green, calx of braſs with ſcales of iron, or with crocus martis. For black, zaffer with manganeſe, or with crocus martis; or manganeſe with tartar. For red, manganeſe or calx of copper and red tartar. For purple, manganeſe with calx of braſs. For yellow, tartar and manganeſe. And for violet-coloured enamel, manganeſe with thrice calcined braſs.

In making theſe enamels, the following general cautions are neceſſary to be obſerved. 1. That the pots muſt be glazed with white glaſs, and muſt be ſuch as will bear the fire. 2. That the matter of enamels muſt be very nicely mixed with the colours. 3. When the enamel is good, and the colour well incorporated, it muſt be taken from the fire with a pair of tongs. 4. The general way of making the coloured enamels is this: powder, ſift, and grind all the colours very nicely, and firſt mix them with one another, and then with the common matter of enamels; then ſet them in pots in a furnace, and when they are well mixed and incorporated, caſt them into water; and when dry, ſet them in a furnace again to melt; and when melted, take a proof of it. If too deep-coloured, add more of the common matter of enamels; and if too pale, add more of the colours.

Enamels are uſed either in counterfeiting or imitating precious ſtones, in painting in enamel, or by enamellers, jewellers, and goldſmiths, in gold, ſilvers and other metals. The two firſt kinds are uſually prepared by the workmen themſelves, who are employed in theſe arts. That uſed by jewellers, &c. is brought to us chiefly from Venice or Holland, in little cakes of different ſizes, commonly about four inches diameter, having the mark of the maker ſtruck upon it with a puncheon. It pays the pound 1 s. $7\frac{41}{100}$d. on importation, and draws back 1 s. $5\frac{70}{100}$d. at the rate of 4 s. *per* pound.

ENAMELLING, the art of laying enamel upon metals, as gold, ſilver, copper, *&c.* and of melting it at the fire, or of making divers curious works in it at a lamp. It ſignifies alſo to paint in enamel.

The method of painting in enamel. This is performed on plates of gold or ſilver, and moſt commonly of copper, enamelled with the white enamel; whereon they paint with colours which are melted in the fire, where they take a brightneſs and luſtre like that of glaſs. This painting is the moſt prized of all for its peculiar brightneſs and vivacity, which is very permanent, the force of its colours not being effaced or ſullied with time, as in other painting, and continuing always as freſh as when it came out of the workman's hands. It is uſual in miniature, it being the more difficult the larger it is, by reaſon of certain accidents it is liable to in the operation. Enamelling ſhould only be practiſed on plates of gold, the other metals being leſs pure: copper, for inſtance, ſcales with the application, and yields fumes; and ſilver turns the yellows white. Nor muſt the plate be made flat; for in ſuch caſe, the enamel cracks; to avoid which, they uſually forge them a little round or oval, and not too thick. The plate being well and evenly forged, they uſually begin the operation by laying on a couch of white enamel (as we obſerved above) on both ſides, which prevents the metal from ſwelling and bliſtering; and this firſt lay ſerves for the ground of all the other colours. The plate being thus prepared, they begin at firſt by drawing out exactly the ſubject to be painted with red vitriol, mixed with oil of ſpike, marking all parts of the deſign very lightly with a ſmall pencil. After this, the colours (which are to be before ground with water in a mortar of agate extremely fine, and mixed with oil of ſpike ſomewhat thick) are to be laid on, obſerving the mixtures and colours that agree to the different parts of the ſubject; for which it is neceſſary to underſtand painting in miniature. But here the workman muſt be very cautious of the good or bad qualities of the oil of ſpike he employs to mix his colours with, for it is very ſubject to adulterations. See OIL. Great care muſt likewiſe be taken, that the leaſt duſt imaginable come not to your colours while you are either painting or grinding them; for the leaſt ſpeck, when it is worked up with it, and when the work comes to be put into the reverberatory to be red hot, will leave a hole, and ſo deface the work.

When the colours are all laid, the painting muſt be gently dried over a ſlow fire to evaporate the oil, and the colours afterwards melted to incorporate them with the enamel, making the plate red hot in a fire, like what the enamellers uſe. Afterwards that part of the painting muſt be paſſed over again which the fire hath any thing effaced, ſtrengthening the ſhades and colours, and committing it again to the fire, obſerving the ſame method as before, which is to be repeated till the work is finiſhed.

Method of ENAMELLING *by the lamp.* Moſt enamelled works are wrought at the fire of a lamp, in which, inſtead of oil, they put melted horſe-greaſe, which they call caballine oil. The lamp, which is of copper or white iron, conſiſts of two pieces, in one of which is a kind of oval plate, ſix inches long, and two high, in which they put the oil and the cotton. The other part, called the box, in which the lamp is incloſed, ſerves only to receive the oil which boils over by the force of the fire. This lamp, or where ſeveral artiſts work together, two or three more lamps are placed on a table of proper heighth. Under the table, about the middle of its height, is a double pair of organ-bellows, which one of the workmen moves up and down with his foot, to quicken the flame of the lamps, which are by this means excited to an incredible degree of vehemence. Grooves made with a gauge in the upper part of the table, and covered with parchment, convey the wind of the bellows to a pipe of glaſs before each lamp; and that the enamellers may not be incommoded with the heat of the lamp, every pipe is covered at ſix inches diſtance with a little tin plate, fixed into the table by a wooden handle. When the works do not require a long blaſt, they only uſe a glaſs-pipe, into which they blow with their mouth. It is incredible to what a degree of fineneſs and delicacy the threads of enamel may be drawn at the lamp. Thoſe which are uſed in making falſe tufts of feathers are ſo fine, that they may be wound on the reel like ſilk or thread. The fictitious jets of all colours, uſed in embroideries, are alſo made of enamel; and that with ſo much art, that every ſmall piece hath its hole to paſs the thread through wherewith it is ſewed. Theſe holes are made by blowing them into long pieces, which they afterwards cut with a proper tool.

It is ſeldom that the venetian or dutch enamels are uſed alone; they commonly melt them in an iron-ladle, with an equal part glaſs or cryſtal; and when the two matters are in perfect fuſion, they draw it out into threads of different ſizes, according to the nature of the work. They take it out of the ladle while liquid, with two pieces of broken tobacco pipes, which they extend from each other at arm's length. If the thread is required ſtill longer, then another workman holds one end, and continues to draw it out, while the firſt holds the enamel to the flame. Thoſe threads, when cold, are cut into what lengths the workman thinks fit, but commonly from ten to eleven inches; and as they are all round, if they are required to be flat, they muſt be drawn through a pair of pincers while yet hot. They have alſo another iron-inſtrument in form of pincers, to draw out the enamel by the lamp when it is to be worked or diſpoſed in figures. Laſtly, they have glaſs-tubes of various ſizes, ſerving to blow the enamel into various figures, and preſerve the neceſſary vacancies therein; as alſo to ſpare the ſtuff and form the contours. When the enameller is at work, he ſits before his lamp with his foot on the ſtep that moves on the bellows, and holding in his left hand the work to be enamelled, or the braſs or iron-wires the figures are to be formed on, he directs with his right the enamel thread, which he holds to the flame with a management and patience equally ſurpriſing. There are few things they cannot make or repreſent with enamel; and ſome figures are as well finiſhed, as if done by the moſt ſkilful carvers.

ENARTHROSIS, in anatomy, a ſpecies of diarthroſis. See DIARTHROSIS.

ENCÆNIA, the name of three ſeveral feaſts celebrated by the Jews in memory of the dedication, or rather purification, of the temple, by Judas Maccabeus, Solomon, and Zorababel.

This term is likewiſe uſed in church-hiſtory for the dedication of chriſtian churches.

ENCAMPMENT, the pitching of a camp. See the article CAMP.

ENCANTHIS, in ſurgery, a tubercle ariſing either from the caruncula lachrymalis, or from the adjacent red ſkin, in the great canthus, or angle of the eye, ſometimes ſo large, as to obſtruct not only the puncta lachrymalia, but alſo part of the ſight, or pupil itſelf. See EYE.

In this diſorder, the tears continually run down the cheek, which greatly deforms the eye and face.

It is of two kinds, *viz.* mild, without hardneſs or pain; or malignant, which is livid and very painful. The mild kind is to be treated firſt by ſcarifying, and afterwards applying eſcharotic or cauſtic medicines; and if this proves inſufficient, the tumour may be touched, but with great caution, with lapis infernalis; and to divert the humours from the eye, iſſues and ſetons, with phlebotomy and cooling purges, are proper. If all theſe fail, the ſurgeon is to extirpate the tumour; in which caſe, it is better to leave part of the morbid tubercle, than cut off any part of the lachrymal caruncle, as the remains of it may be afterwards cleared away by eſcharotics. After the operation, it is proper to apply deterging and healing medicines, or a collyrium of lapis tutiæ, myrrh, *&c.* till the wound is healed.

As to the malignant encanthis, inclining to be cancerous, it is generally better to let it alone, and to mitigate its uneaſineſs with cooling and lenient collyria, rather than exaſperate it by the operation, or by eſcharotic medicines.

ENCAUSTICE and ENCAUSTUM, the ſame with enamelling and enamel. See ENAMELLING and ENAMEL.

ENCEINTE, in fortification, is the wall or rampart which ſurrounds a place, ſometimes compoſed of baſtions or curtains, either faced or lined with brick or ſtone, or only made of earth. The enceinte is ſometimes only flanked by round or ſquare towers, which is called a roman wall.

ENCEPHALI, in medicine, worms generated in the head, where they cauſe ſo great a pain, as ſometimes to occaſion diſtraction.

The encephali are very rare, but there are ſome diſeaſes wherein they ſwarm; from whence we are told peſtilential fevers have wholly ariſen. Upon the diſſection of one who died of this fever, a little, ſhort, red worm was found in the head, which malmſey wine, wherein horſe-radiſh had been boiled, could only deſtroy. This medicine was afterwards tried on the ſick, moſt of whom it cured. The like worms have alſo been taken out by trepanning, and the patient cured. Thoſe worms that generate in the noſe, ears, and teeth, are alſo called encephali.

ENCEPPE', in heraldry, denotes fettered, chained, or girt about the middle, as is uſual with monkeys.

ENCHANTER, a perſon ſuppoſed to practiſe enchantment, or faſcination. See Fascination, Witchcraft, *&c.*

Enchanter's nightshade, in botany. See the article Circæa.

ENCHASING, Inchasing, or Chasing, the art of enriching and beautifying gold, ſilver, and other metal-work, by ſome deſign, or figures repreſented thereon, in low relievo. See the articles Relievo and Sculpture.

Enchaſing is practiſed only on hollow thin works, as watch-caſes, cane-heads, tweezer-caſes, or the like. It is performed by punching or driving out the metal, to form the figure, from within ſide, ſo as to ſtand out prominent from the plane or ſurface of the metal. In order to this, they provide a number of fine ſteel-blocks, or punchions, of divers ſizes; and the deſign being drawn on the ſurface of the metal, they apply the inſide upon the heads or tops of theſe blocks, directly under the lines or parts of the figures; then, with a fine hammer, ſtriking on the metal, ſuſtained by the block, the metal yields, and the block makes an indenture, or cavity, on the inſide, correſponding to which there is a prominence on the outſide, which is to ſtand for that part of the figure.

Thus the workman proceeds to chaſe and finiſh all the parts by ſucceſſive application of the block and hammer, to the ſeveral parts of the deſign. And it is wonderful to conſider with what beauty and juſtneſs, by this ſimple piece of mechaniſm, the artiſts in this kind will repreſent foliages, groteſques, animals, hiſtories, *&c.*

ENCHELYS, εγχελυς, the eel, in ichthyology. See the article Eel. Hence

ENCHELIDES is uſed to denote the capillary eels, diſcovered by the help of microſcopes in pepper-watter, and the like. They are a genus of that claſs of animalcules, called gymnia, have no viſible limbs or tails, and are of a cylindric figure; they are only viſible by the help of very powerful glaſſes.

ENCLAVE', in heraldry, denotes a thing's being let into another, eſpecially when the piece, ſo let in, is ſquare.

ENCLITICA, in grammar, particles which are ſo cloſely united with other words, as to ſeem part of them, as in *virumque*, &c.

There are three enclitic particles in latin, viz, *que*, *ne*, *ve*: but there are a great many in the greek, as τȣ, τε, μȣ, μοι, σȣ, σοι, *&c.*

ENCRASICHOLUS, or Engraulis, the Anchovy, in ichthyology. See the article Anchovy.

ENCRATITES, *encratitæ*, in church-hiſtory, heretics who appeared towards the end of the ſecond century: they were called encratites, or continentes, becauſe they gloried in abſtaining from marriage, and the uſe of wine and animal food. Their chaſtity, however, was a little ſuſpected, on account of their uſing all ſorts of means to draw women into their ſect, and always keeping company with them.

ENCYCLOPÆDIA, ενκυκλοπαιδεια, in literary hiſtory, the ſame with cyclopædia. See Cyclopædia and Dictionary.

ENCYSTED tumour. See the articles Tumour and Cyst.

END for end, in the ſea-language, is ſaid of a rope that has run quite out of the block, wherein it was reeved.

ENDECAGON, in geometry, the ſame with hendecagon. See Hendecagon.

ENDEMIC, or Endemical diseases, thoſe to which the inhabitants of particular countries are ſubject more than others, on account of the air, water, ſituation, and manner of living. See the article Disease.

It has been always obſerved, that people of particular countries were peculiarly ſubject to particular diſeaſes, which are owing to their manner of living, or to the air and effluvia of the earth and water. Hoffman has made curious obſervations on diſeaſes of this kind: he obſerves, that the Laplanders have often diſtempers of the eyes, which is owing to their living in ſmoke, or being blinded with the ſnow; that pleuriſies and inflammation of the lungs are alſo very frequent among them; and that the ſmall pox often rages there with great violence: he obſerves alſo, that ſwellings of the throat have always been common to the inhabitants of mountainous countries; and the old roman authors ſay, Who wonders at a ſwelled throat in the Alps? the people of Carinthia, Styria, the Hartz-foreſt, Tranſylvania, and the inhabitants of Cronſtrad, he obſerves, are all ſubject to this diſeaſe, from the ſame cauſe: and it ſeems that theſe ſtrumous ſwellings are owing to the water which they drink, and which, in mountainous places, is uſually very much impregnated with ſparry or ſtony particles. The French are peculiarly troubled with fevers, with worms, and with hydroceles, and ſarcoceles; and all theſe diſorders ſeem to be owing originally to their eating very large quantities of cheſnuts. The people of our own nation are peculiarly afflicted with hoarſeneſſes, catarrhs, coughs, dyſenteries, and conſumptions: the women with the fluor albus, or whites; and the children with a diſeaſe ſcarce known elſewhere, which we call the rickets. In different parts of Italy, different diſeaſes reign: at Naples the venereal diſeaſe is more common than in any other part of the world: at Venice, people are peculiarly ſubject to the bleeding piles. At Rome, tertian agues and lethargic diſtempers are moſt known: in Tuſcany, the epilepſy: in Apulia, burning fevers, pleuriſies, and that ſort of madneſs which is attributed to the bite of the tarantula, and which, it is ſaid, is only cured by muſic. In Spain, apoplexies are common, as alſo melancholy, hypochondriacal complaints, and bleeding piles. The Dutch are peculiarly ſubject to the ſcurvy, and the ſtone in the kidneys. Denmark, Sweden, Pomerania, and Livonia are all terribly afflicted with the ſcurvy. The Ruſſians and Tartars are afflicted with ulcers made by the cold, of the ſame nature with what we call chilblanes: and in Poland and Lithuania there reigns a peculiar diſeaſe, called the plica polonica, ſo terribly painful and offenſive, that ſcarce any thing can be worſe. The people of Hungary are very ſubject to the gout and rheumatiſm; they are more infeſted with lice and fleas than any other people in the world; and they have a peculiar diſeaſe, which they call cremor. The Germans, in different parts of the empire, are ſubject to different reigning diſeaſes: in Weſtphalia they have the peripneumonies and the itch: in Sileſia, Franconia, Auſtria, *&c.* they are ſubject to fevers of the burning kind, to hæmorrhages, to the gout, inflammations, and conſumptions. In Conſtantinople the plague always rages. And in the Weſt-indian iſlands, malignant fevers, and the moſt terrible colics are frequent.

ENDIVE, *endivia*, in botany, *&c.* the broad-leaved ſuccory. See CICHORIUM. Marſigli deſcribes a plant, which he calls ſea-endive, from its reſemblance to the common garden-endive.

ENDORSE, in heraldry, an ordinary, containing the eighth part of a pale, which Leigh ſays is only uſed when a pale is between two of them.

ENDORSED, *endorſé*, in heraldry, is ſaid of things borne back to back, more uſually called adoſſé. See ADOSSE'.

ENDORSEMENT, or INDORSEMENT, in law. See INDORSEMENT.

ENDOWMENT, in law, denotes the ſettling a dower on a woman; though ſometimes it is uſed figuratively, for ſettling a proviſion upon a parſon, on the building of a church; or the ſevering a ſufficient portion of tithes for a vicar, when the benefice is appropriated.

ENEMA, in medicine, the ſame with clyſter. See the article CLYSTER.

ENEMY, in law, an alien or foreigner, who publicly invades the kingdom.

Whether enemies come into the realm by themſelves, or in company with engliſh traitors, they are only dealt with according to the martial law, and not puniſhed as traitors: yet where a ſubject of a foreign nation, who lives here under the king's protection, takes up arms againſt the government, he ſhall be puniſhed as a traitor.

ENERGUMENS, in church-hiſtory, perſons ſuppoſed to be poſſeſſed by the devil, concerning whom there were many regulations among the primitive chriſtians. They were denied baptiſm, and the euchariſt; at leaſt, this was the practice of ſome churches: and though they were under the care of exorciſts, yet it was thought a becoming act of charity to let them have the public prayers of the church, at which they were permitted to be preſent. See the article EXORCISM.

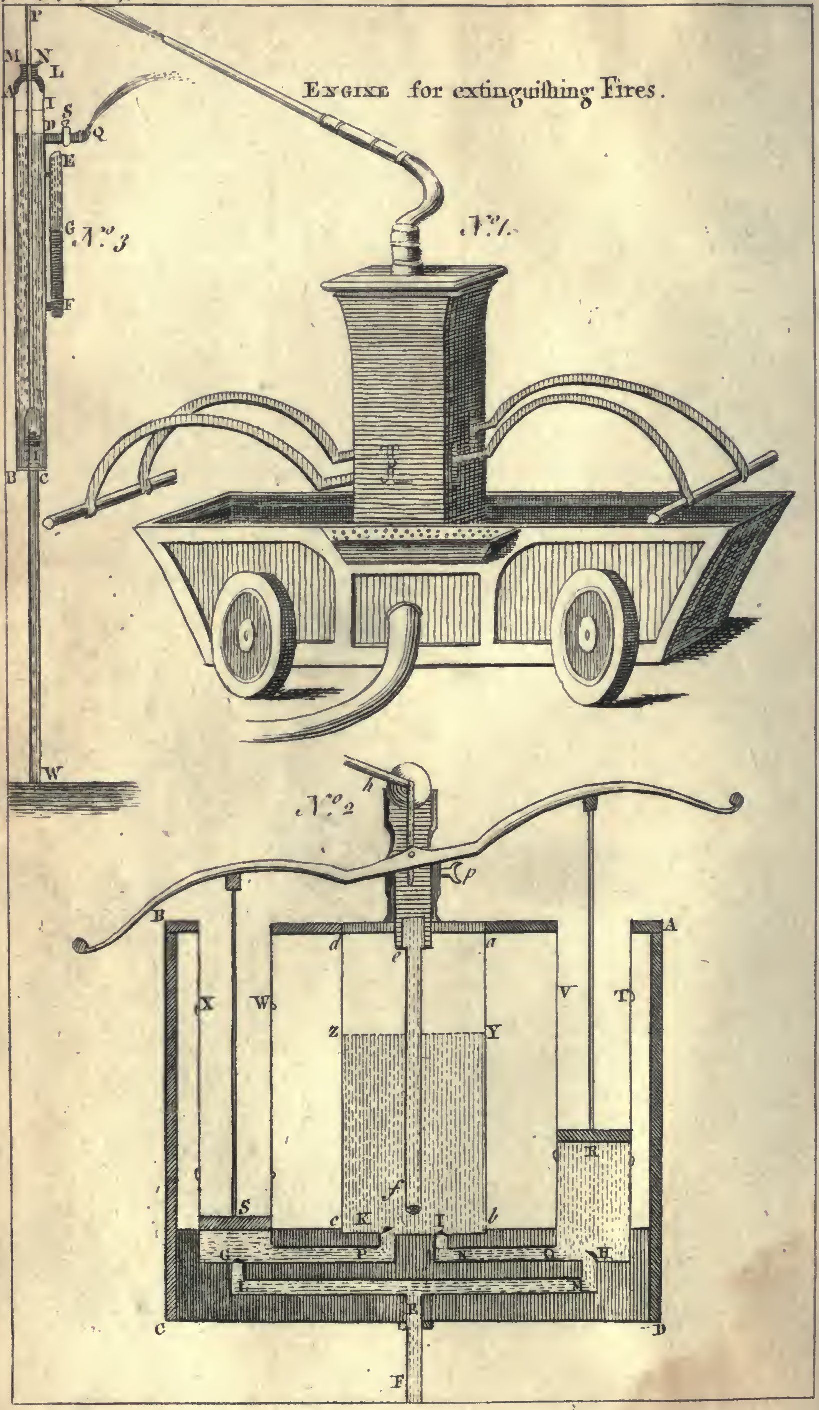
ENERGY, *ενεργεια*, a term of greek origin, ſignifying the power, virtue, or efficacy of a thing. It is alſo uſed, figuratively, to denote emphaſis of ſpeech. See the article EMPHASIS.

ENFANS PERDUS, the ſame with forlorn hope. See the article FORLORN.

ENFILADE, in the art of war, is uſed in ſpeaking of trenches, or other places, which may be ſcoured by the enemy's

ſhot,

ENGINE for extinguiſhing Fires.



ſhot, along their whole length. In conducting the approaches at a ſiege, care muſt be taken that the trenches be not enfiladed from any work of the place. See the article TRENCHES.

ENFRANCHISEMENT, in law, the incorporating a perſon into any ſociety or body politic: thus, where any perſon is enfranchiſed, or made free, of any city, borough, or company, he is ſaid to have a freehold therein during life; and cannot, for barely endeavouring any thing againſt the corporation, forfeit the ſame. Naturalization is alſo another kind of enfranchiſement. See NATURALIZATION.

ENGASTRIMYTHI, in pagan theology, the pythians, or prieſteſſes of Apollo, who delivered oracles from within, without any action of the mouth or lips. See the article PYTHIA.

The antient philoſophers, &c. are divided upon the ſubject of the engaſtrimythi. Hippocrates mentions it as a diſeaſe. Others will have it a kind of divination. Others attribute it to the operation or poſſeſſion of an evil ſpirit. And others to art and mechaniſm. M. Schottus maintains that the engaſtrimythi of the antients were poets, who, when the prieſts could not ſpeak, ſupplied the defect by explaining in verſe what Apollo dictated in the cavity of the baſon on the ſacred tripod.

ENGENDERING, a term ſometimes uſed for the act of producing or forming any thing: thus meteors are ſaid to be engendered in the middle region of the atmoſphere, and worms in the belly. See the articles GENERATION, METEOR, WORM, &c.

ENGERS, the capital of a county of the ſame name, in Germany, ſituated on the river Rhine, about ſeven miles north of Coblentz.

ENGHIEN, a city of Hainault, about fourteen miles ſouth-weſt of Bruſſels.

ENGINA, an iſland on the north-eaſt of the Morea, about fifty miles eaſt of Corinth.

ENGINE, in mechanics, is a compound machine, made of one or more mechanical powers, as levers, pullies, ſcrews, &c. in order to raiſe, caſt, or ſuſtain any weight, or produce any effect which could not be eaſily effected otherwiſe.

Engines are extremely numerous; ſome uſed in war, as the battering-ram, balliſta, waggons, chariots, &c. others in trade and manufactures, as cranes, mills, preſſes, &c. others to meaſure time, as clocks, watches, &c. and others for the illuſtration of ſome branch of ſcience, as the orrery, cometarium, and the like. See *Battering*-RAM, BALLISTA, &c.

In general we may obſerve, concerning engines, that they conſiſt of one, two, or more of the ſimple powers variouſly combined together; that in moſt of them the axis in peritrochio, the lever, and the ſcrew are the conſtituent parts; that in all a certain power is applied to produce an effect of much greater moment; and that the greateſt effect, or perfection, is when it is ſet to work with four ninths of that charge which is equivalent to the power, or will but juſt keep the machine in equilibrio. See the articles MAXIMUM and MECHANICS.

In all machines, the power will juſt ſuſtain the weight, when they are in the inverſe ratio of their diſtances from the center of motion. See the articles POWER and EQUILIBRIUM.

It being of the utmoſt importance to diminiſh the friction of engines, ſeveral contrivances have been invented for this purpoſe. See the article FRICTION.

ENGINE *for extinguiſhing fires*, a machine for raiſing a conſiderable quantity of water, in one continued ſtream, for the extinguiſhing accidental fires.

The beſt engine of this kind is that of Mr. Newſnam, an engine-maker of London, which is ſo contrived that part of the men who work it exert their ſtrength by treading, the very beſt way of working ſuch engines; the whole weight of the body being ſucceſſively thrown on the force of the pumps, and even part of a man's ſtrength may be added to the weight, by means of horizontal pieces, to which he may apply his hands when treading. This is the reaſon why, with the ſame number of men, his engine will throw water farther, higher, and in greater quantities than any engines of the ſame ſize, hitherto contrived. See a perſpective view of the whole engine, ready for working, in plate LXXXIX, n° 1.

The nature and effect of this engine will be eaſily underſtood from a perpendicular ſection of it repreſented *ibid.* n° 2. The water is raiſed by the preſſure of the atmoſphere, by the force of the piſtons, and by the ſpring of condenſed air, in the following manner: thus, when the piſton R is raiſed, a vacuum would be made in the barrel T V, did not the water follow it from the inferior canal L M (through the valve H) which riſes through the glaſs tube E F, immerſed in the water of a veſſel, by the preſſure of the atmoſphere on the ſurface thereof. By the depreſſion of the piſton R, the water in the barrel T V is forced through the ſuperior canal O N, to enter by the valve I, into the air-veſſel *a b c d*; and the like being done alternately by the other barrel W X, and its piſton S, the air-veſſel is by this means continually filling with water, which greatly compreſſes the air above the ſurface of the water in the veſſel, and thereby proportionably augments its ſpring, which is at length ſo far increaſed, as to re-act with great force on the ſurface Y Z of the ſubjacent water; which aſcending through the ſmall tube *e f*, to the ſtop-cock *e g*, is there, upon turning the cock *p*, ſuffered to paſs through a pipe *b*, fixed to a ball and ſocket, from the orifice of which it iſſues with a great velocity, to a very great height or diſtance, in a ſmall continued ſtream, directed every way, or to any particular place, by means of the ball and ſocket.

The greateſt artifice of this engine is its contrivance to produce a continued ſtream, which is done by compreſſion, and the conſequent increaſed elaſticity of the air in the barrel *a b c d*, called the air-veſſel. See the article AIR.

When, therefore, the air-veſſel is half filled with water, and the air thereby compreſſed into half its firſt ſpace, its ſpring will be equal to twice the preſſure of the atmoſphere; ſo that, on turning the ſtop-cock *p*, the air within preſſing on the ſubjacent water with twice the force it meets with from the external air in the pipe *e f*, will cauſe the water to ſpout out of the engine to the height of 32 or 33 feet, if the friction be not too great. When the air-veſſel is $\frac{2}{3}$ full of water, the ſpace which the air takes up is only $\frac{1}{3}$ of its firſt ſpace; whence its ſpring being three times as great as that of the common air, it will project the water with twice the force of the atmoſphere, or throw it to the height of 64 or 66 feet. In the ſame manner, when the air-veſſel is $\frac{3}{4}$ full of water, the air will project it to the height of 96 or 99 feet; and when $\frac{4}{5}$ full of water, to the height of 132 feet. Hence it is eaſy to calculate the different heights to which the water will riſe, as in the following table.

*

Height of the water.	Height of the compreſſed air.	Proportion of the air's ſpring.	Height to which the water will riſe.
$\frac{1}{2}$	$\frac{1}{2}$	2	33 feet.
$\frac{2}{3}$	$\frac{1}{3}$	3	66
$\frac{3}{4}$	$\frac{1}{4}$	4	99
$\frac{4}{5}$	$\frac{1}{5}$	5	132
$\frac{5}{6}$	$\frac{1}{6}$	6	165
$\frac{6}{7}$	$\frac{1}{7}$	7	198
$\frac{7}{8}$	$\frac{1}{8}$	8	231
$\frac{8}{9}$	$\frac{1}{9}$	9	264
$\frac{9}{10}$	$\frac{1}{10}$	10	297

As the air-veſſel is the cauſe of the continued ſtream, we may naturally infer, that if ſuch an air-veſſel were adapted to the common houſe-pump, it would become a uſeful engine for extinguiſhing accidental fires. Now this may be effected in the following or ſome other analogous manner: let A B C D (*ibid.* n° 3.) be the barrel of the pump, P H the rod and piſton, C W the pipe going down to the water of the well at W. Towards the lower part of the barrel is a ſhort tube, by which the air-veſſel F E is fixed to, and communicates with, the barrel of the pump. A M N L is a collar of leather, ſo fixed on the top of the barrel, and adapted to the rod, that it may move freely in the leathers, without permitting the air to paſs in or out between. The nozzle or ſpout D, has a ſtop-cock S, to let out or keep in the water at pleaſure. Q is a piece ſcrewed on, to direct the ſtream, by a ſmall leather-pipe at the end. When the piſton is raiſed from the bottom of the pump-barrel, the water above will be forced into the air-veſſel, and there compreſs the air; it will alſo compreſs the air on the top of the barrel, for the water will not be higher than the ſpout D at firſt, when the ſtop-cock is ſhut; but afterwards, as the air is confined, it will be compreſſed at top, the water riſing to I. This compreſſed air, in each place, will act upon the water by its ſpring, and, upon turning the ſtop-cock, will force it out in a continued ſtream thro' the pipe at Q, and that with a greater or leſſer degree of force, as occaſion requires, that being abſolutely in the power of the perſon working the pump.

Fig. 1. PILE-ENGINES

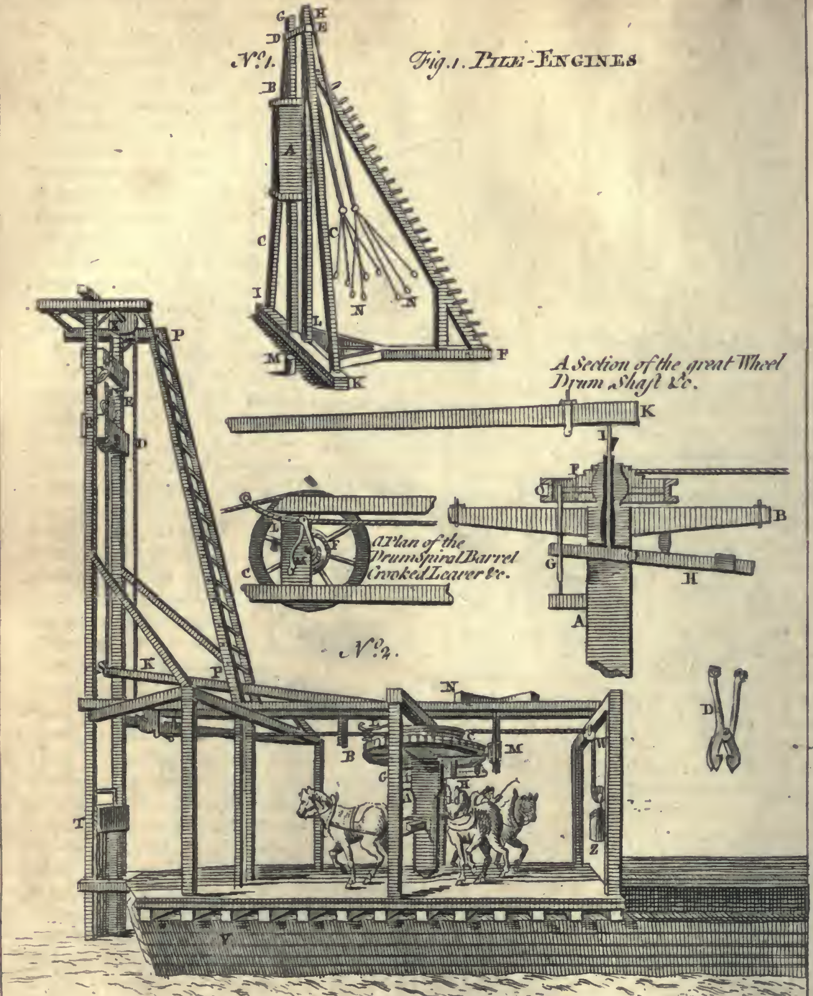
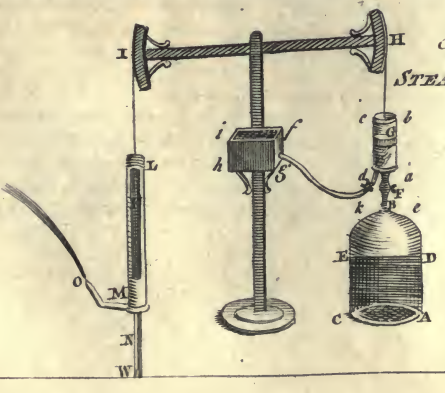

No. 1.
G H E D B A C C I L N N M K F
A Section of the great Wheel Drum Shaft &c.
K I P O B G H A
A Plan of the Drum Spiral Barrel Crooked Leaver &c.
L F C
No. 2.
P K P N B G M H D Z T V
D

Fig. 2. STEAM-ENGINE.



Pile-ENGINE, one contrived for driving piles, whereof there are ſeveral kinds. See the article PILE.

The moſt common and ſimple engine of this kind, as repreſented in plate XC. fig. 1. n° 1. conſiſts of the cill K I, and the frame F L, on which are fixed the upright pieces L H and L G, ſupported by the ſide braces, C, C, and the hind brace F E (which has pins on it to make it ſerve as a ladder) and held together by a ſquare collar E D. The rammer A, being a very heavy piece of wood, or iron, ſlides up and down between the cheeks or upright pieces L H, L G, and is drawn up by means of its hook B, with two ropes H O, G O, having each five ſmaller ropes with handles at N, N, for ten men to pull up the rammer to a certain height (the great ropes running over two pullies or rollers on the iron-pin H G) and then let it fall again all at once upon the head of the pile at M, to drive it into the ground. Now, ſuppoſe the rammer A, weighs 500 ℔, and falls the height of one foot, it will fall that height in a quarter of a ſecond, and conſequently have a velocity able to carry it uniformly 2 feet in the ſame time, that is, at the rate of 8 feet in a ſecond, at the very inſtant it ſtrikes the pile M. Therefore, meaſuring the maſs by the velocity, *viz.* 500×8 we ſhall have 4000 for the momentum of the rammer with ſuch a fall. See the article DESCENT. But if the rammer be raiſed up to the height of four feet, it will fall that height in half a ſecond, and have, at the time of percuſſion, a velocity to carry it 8 feet in half a ſecond, without any farther help from gravity, ſo that we muſt now multiply 16 feet (the preſent velocity, ſince it goes at the rate of 16 feet in a ſecond) by 500, the maſs of the rammer, which will give us a double momentum, wherewith it will ſtrike the pile in this laſt caſe; for $500\times 16=8000$. If we conſider any other height from which the rammer falls (for one may employ a capſtan, windlaſs, or pullies to raiſe it to a very great height) the momentum with which it ſtrikes the pile, will always be as the ſquare root of the height from which the rammer fell.

If a pile is to be driven obliquely, the engine muſt be ſet ſo that the cheeks may have the ſame obliquity, and the blow will ſtill be perpendicular to the head of the pile; but then the force of the blow muſt not be eſtimated from the length, but from the height of the deſcent, in the manner already ſhewn.

Mr. Valoué's ENGINE *for driving piles*, uſed at building Weſtminſter-bridge, is conſtructed as follows. A (plate XC. n° 2.) is the great ſhaft, on which are the great wheel and drum: B the great wheel with cogs, that turns a trundle-head with a fly, to prevent the horſe's falling when the ram is diſcharged; C the drum on which the great rope is wound; D the follower (with a roller at one corner) in which are contained the tongs, to take hold of the ram, and are faſtened to the other end of the great rope, which paſſes over the pulley, near the upper end of the guides between which the ram falls; E the inclined planes, which ſerve to open the tongs, and diſcharge the ram; F the ſpiral barrel that is fixed to the drum, on which is wound a rope with a counterpoiſe, to hinder the follower from accelerating, when it falls down to take up the ram; G the great bolt which locks the drum to the great wheel; H the ſmall lever, which has a weight fixed at one end, paſſes through the great ſhaft below the great wheel, and always tends to puſh the great bolt upwards, and lock the drum to the great wheel; I the forcing bar, which paſſes thro' the hollow axis of the great ſhaft, bears upon the ſmall lever, and has near the upper end a catch by which the crooked lever keeps it down; K the great lever, which preſſes down the forcing bar, and diſcharges the great bolt at the time the long end is lifted up by the follower; L the crooked lever, one end of which has a roller, that is preſſed upon by the great rope, the other end bears upon the catch of the forcing bar during the time the follower is deſcending; M the ſpring that preſſes againſt the crooked lever, and diſcharges it from the catch of the forcing bar as ſoon as the great rope ſlackens and gives liberty to the ſmall lever to puſh up the bolt.

By the horſe's going round, the great rope is wound about the drum, and the ram is drawn up, till the tongs come between the inclined planes, where they are opened, and the ram is diſcharged.

Immediately after the ram is diſcharged, the roller, which is at one end of the follower, takes hold of the rope that is faſtened to the long end of the great lever, and lifts it up; the other end preſſes down the forcing bar, unlocks the drum, and the follower comes down by its own weight.

As ſoon as the follower touches the ram, the great rope ſlackens, and the ſpring M diſcharges the crooked lever from the catch of the forcing bar, and gives liberty to the ſmall lever to puſh up the great bolt, and to lock the drum to the great wheel, and the ram is drawn up again as before.

Steam-ENGINE, a machine to raiſe water by fire, or rather by the force of water turned into ſteam.

The following is a deſcription of this engine in its firſt ſtate, and original ſimplicity. A B C (plate XC. fig. 2.) is a copper-veſſel, partly filled with water to D I, which, being ſet over a fire and made to boil, will fill the upper part D B E with an elaſtic vapour, the ſufficient ſtrength whereof is known by its forcing open a valve at *e*: this heated elaſtic ſteam is, by turning a cock at F, let into the barrel *a b c d*, where, by its elaſtic force, it raiſes the piſton G, which drives the air above it through a proper clack at the top. After this, that the piſton may by its weight deſcend, a little cold water from the ciſtern *f g h i*, is let in at the bottom by turning a cock at *k*, which, in form of a jet, condenſes the hot ſteam in the barrel into 13000 times leſs ſpace than before it took up, which make a ſufficient vacuum for the piſton to deſcend in. The piſton G, and lever H I being thus put into motion, do accordingly raiſe and depreſs the piſton K in the barrel of the forcing pump L M, on the other ſide; which, by the pipe N, draws the water from the depth W, and forces it to riſe and ſpout through the tube O, continued to any height at pleaſure. See the article PUMP.

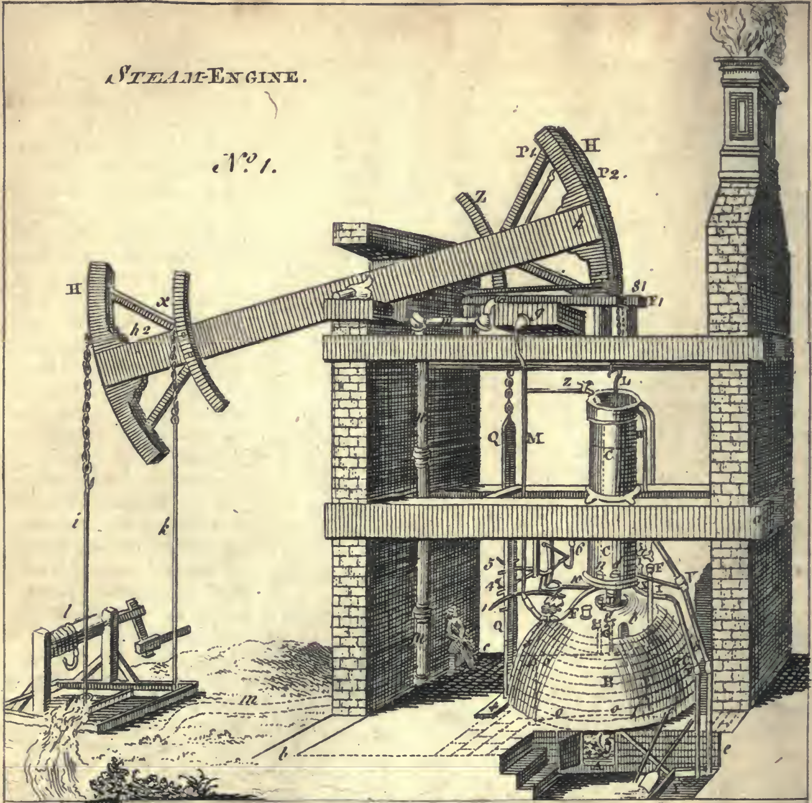
Thus is the ſteam-engine a very ſimple and plain machine, where a very powerful ſtroke for working of pumps is performed by only turning two cocks alternately; and yet a perſon who knows nothing of it, would imagine it to be very complex, by the number of parts that offer themſelves to view. But here we muſt diſtinguiſh between what performs the material operations of the engine, and what ſerves for conveniency and the juſt regulation of the ſaid operations; for not above the hundredth part of the power of this engine is employed to turn the cocks and regulate all the motions, as will appear from what follows.

The ſtructure of the ſteam-engine, as uſed at preſent, is repreſented in plate XCI. n° 1. concerning which we are to obſerve, 1. That there may be always water in the ciſtern *g*, to inject into the ſteam to condenſe it, there is an arch *x*, fixed near the arch H, at the pump end, from whence another pump-rod *k*, with its piſton, draws water from a ſmall ciſtern near the mouth of the pit, ſupplied from the water raiſed at *p*, and forces it up the pipe *m m m*, to keep the injecting ciſtern *g* always full. 2. As the piſton C which moves up and down the cylinder ought to be air-tight, a ring of leather, or a piece of match, which lies upon its circumference next to the inſide of the cylinder, muſt be kept moiſt and ſwelled with water; this is ſupplied from the injecting ciſtern by a ſmall pipe *z*, always running down upon the piſton, but in a very ſmall quantity, if the work be well performed. L is a leaden cup, whoſe office is to hold the water that lies on the piſton, leſt it ſhould flow over when the piſton is arrived at its greateſt height in the cylinder, as W, at which time if the cup is too full, the water will run down the pipe LV, into the waſte-well at Y. 3. As the water, in the boiler B, muſt waſte by degrees, as it is conſtantly producing ſteam, and that ſteam continually let out for working the engine, there ought to be a conſtant ſupply of the water to boil: this is performed by means of the pipe F *f*, about three feet long, going down a foot under the ſurface of the water in the boiler, with a funnel F, at top, always open, and ſupplied by the pipe W, with water from the top of the ciſtern, which has the advantage of being always warm, and, therefore, not apt to check the boiling of the water in the copper. 4. That the boiler may not have the ſurface of the water too low (which would endanger burſting) or too high (which would not leave room enough for ſteam) there are two gauge-pipes at G, one going a little below the ſurface of the water when at a proper height, and the other ſtanding a little above it: when every thing is right, the ſtop-cock of the ſhorter pipe being opened gives only ſteam, and that of the long one water; but if otherwiſe, both cocks will give ſteam when the ſurface is too low, and both give water when it is too high; and hence the cock which feeds the boiler at F may be opened to

ſuch

STEAM-ENGINE.

No. 1.



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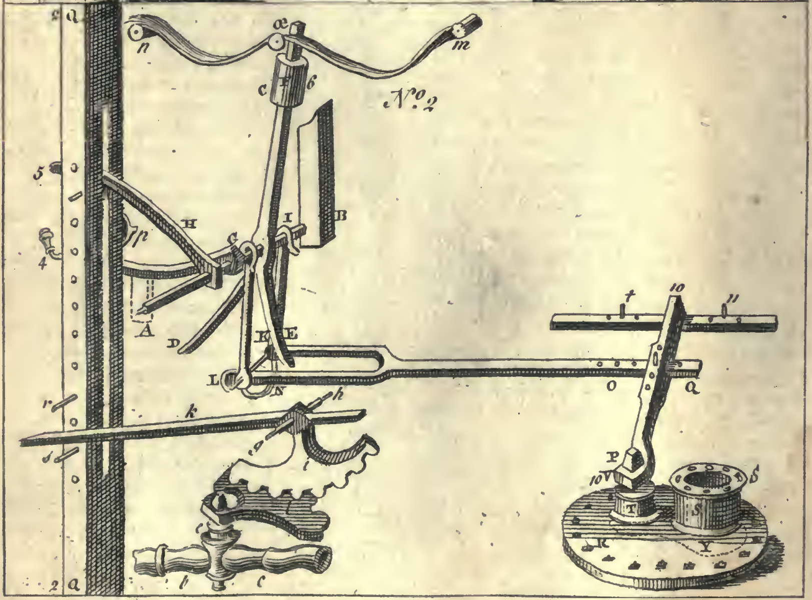
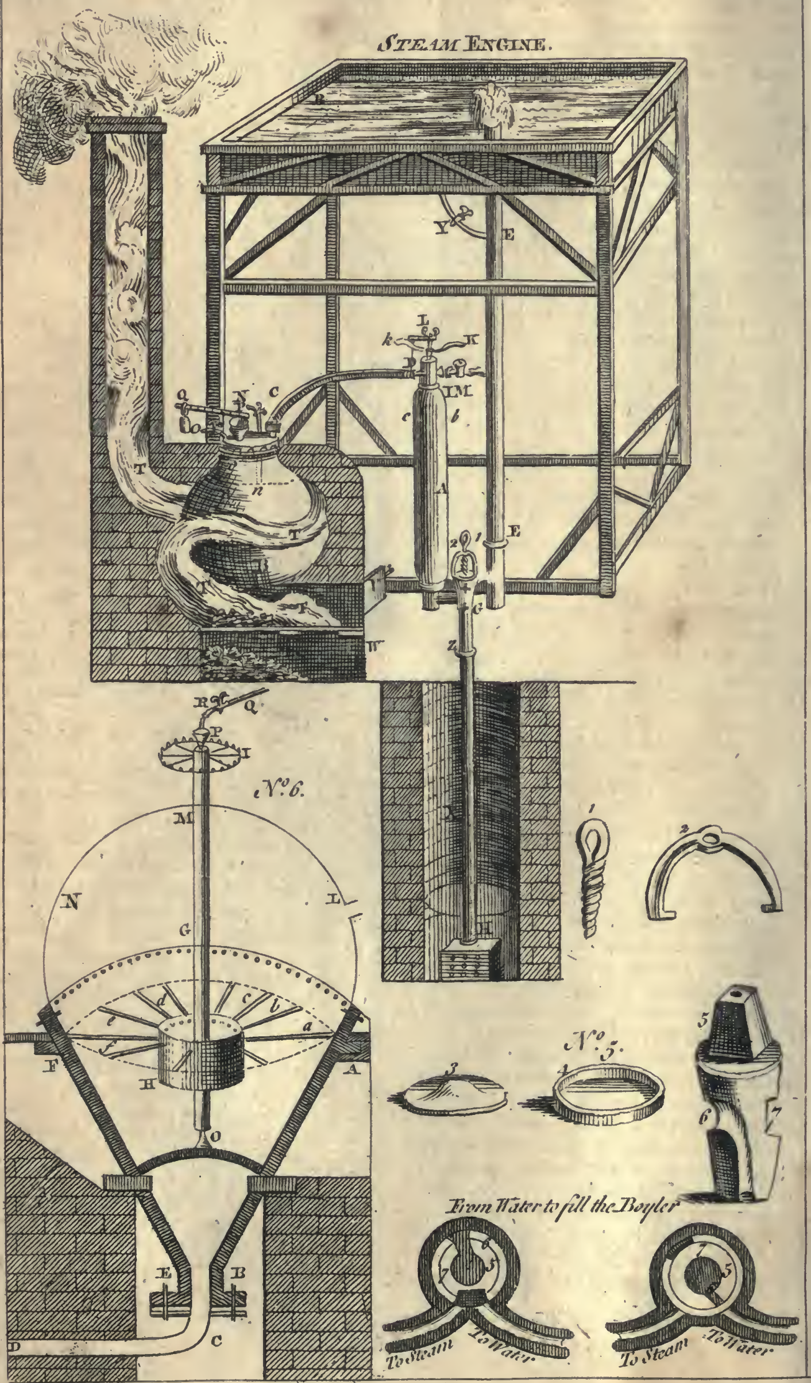


ſuch a degree as always to keep the ſurface of water to its due heighth. 5. As cold water is injected into the cylinder at every ſtroke, and as that water might in time fill the cylinder, and hinder the operation of the engine, there is a pipe coming from the bottom of the cylinder *d* T Y, called the eduction pipe, through which the water that has been injected, comes down every time the ſteam is let into the cylinder. This eduction pipe goes an inch or two under water in the waſte well Y, and having its end turned up is ſhut with a valve Y to keep out the air from preſſing up the pipe, but permitting the injected air coming the other way to be diſcharged; by which means the cylinder is kept empty. 6. Leſt the ſteam ſhould grow too ſtrong for the boiler, and burſt it, there is a valve fixed at *b* with a perpendicular wire ſtanding up from the middle of it, to put weights of lead upon, by which to examine the ſtrength of the ſteam puſhing againſt it from within. Thus the ſteam is known to be as ſtrong as the air, if it will raiſe up ſo much weight on the valve as is at the rate of 15 ℔. to an inch ſquare; becauſe that is the weight of the air, nearly, on every inch ſquare. When the ſteam becomes ſtronger than what is required, it will lift up the valve and go out. This valve is called the puppet-clack. 7. The ſteam is always in a fluctuating condition, yet never $\frac{1}{10}$ ſtronger or weaker than common air. For it has been found that the engine will work well, when there is the weight of one pound on every ſquare inch of the valve *b*. This ſhews that the ſteam is then $\frac{1}{15}$ part ſtronger than the common air. Now as the heighth of the feeding pipe from the funnel F to the ſurface of the water S *s* is not above three feet, and 3½ feet of water is $\frac{1}{10}$ of the preſſure of air; if the ſteam were $\frac{1}{10}$ part ſtronger than air, it would puſh the water out at E; which ſince it does not do, it cannot be ſtronger than air, even in this caſe, where the regulator being ſhut, it is moſt of all confined. 8. When the regulator is open, the ſteam gives the piſton a puſh on the underſide, then occupying more ſpace, the ſteam comes to be a balance only for the outward air, and ſo only ſuſtains the piſton; but the over weight of the pump-rods, at the contrary end of the beam *b* 2, draws up the piſton beyond C as far as W. The ſteam, then, expanded ſo as to fill up all the cylinder, would not quite ſupport it, if it was not for the over weight above-mentioned. If this was not true, when the end *b* 2 is down as low as it can go, and reſts upon the beams that bear its center, the chain L H above the piſton would grow ſlack, and the piſton might ſometimes be puſhed out of the cylinder, which never happens. Again, when firſt the ſteam is let into the cylinder, the injected water is puſhed out at the eduction pipe *d* T Y, and is all out of the cylinder by that time the piſton is got up to C. If then the ſteam was ſtronger than air, it would fly out at Y after the water, the valve Y not being loaded. If it were exactly equal to the ſtrength of the air, it would juſt drive all the water out at Y, but could not follow itſelf, the preſſure being equal on each ſide of the valve by ſuppoſition. If it be weaker than the air, it will not force all the water out of the pipe *d* T Y, but the ſurface will ſtand, ſuppoſe at T, where the column of water T Y added to the ſtrength of the ſteam, is equal to the preſſure of the air. When the ſteam is $\frac{1}{10}$ weaker than the air, the height T Y is equal 3½ feet. Now ſince the whole perpendicular diſtance from *d* to Y is but four feet, and the ſteam is always ſufficient to expel the water; it is plain it can never be more than $\frac{1}{10}$ part weaker than the air, when weakeſt. 9. As there is air in all the water injected, and that air cannot be taken out, or condenſed with the ſteam by the jet of cold water coming in at *n*, the whole operation would be diſturbed, and only a very imperfect vacuum made, were it not for the following contrivance. We are to remember that when ſteam is become as ſtrong as air, it is above ſixteen times rarer; ſo that air will precipitate in ſteam, as quickſilver would in water. Therefore all the air extricated from the injected water, lies at the bottom of the cylinder over the ſurface of ſo much of the injected water as is come down to *d n*. Now there is without the cylinder at 4, a little cup with a valve, and from under the valve, a pipe going laterally into the cylinder above its bottom to receive the air into the cup. When, therefore, the ſteam firſt ruſhes into the cylinder, and is a little ſtronger than the outward air, it will force the precipitated air to open the valve at 4, and make its eſcape; but the ſteam cannot follow, becauſe it is weaker than the external air, as the piſton, by aſcending, gives it room to expand. This valve from the noiſe it makes is called the ſnifting clack. 10. But amongſt the greateſt improvements of this engine, we may reckon that contrivance by which the engine itſelf is made to open and ſhut the regulator and injection-cock, and that more nicely than any perſon attending could poſſibly do it. For if the man who turns the regulator at E, and the injection-cock N, when the piſton is coming down, opens the regulator and lets in the ſteam too ſoon to raiſe the piſton again, the ſtroke will be ſhorter than it ought to be; and if he does not open the regulator ſoon enough, the piſton coming down with a prodigious force, will very probably ſtrike againſt the throat pipe D *d* at *d*, and cruſh it to pieces. Likewiſe when the regulator is open, the ſteam going into the cylinder, and the piſton riſing, the ſtroke will not have its full length, if the ſteam is turned off, and the cold water injected too ſoon; and if injected too late, the ſteam may throw the piſton quite out of the cylinder's top at L. To prevent, therefore, all ſuch accidents, there is fixed to an arch Z, at a proper diſtance from the arch P, a chain, from which hangs a perpendicular piece, or working beam Q Q, which comes down quite to the floor, and goes through it in a hole which it fits very exactly. This piece has a long ſlit in it, and ſeveral pin holes and pins for the movement of ſeveral levers deſtined to the office of opening and ſhutting the cocks after the following manner. 11. Between two perpendicular pieces of wood on each ſide of P, there is a ſquare axis A B (*ibid.* n° 2.) which has upon it ſeveral iron pieces of the lever kind. The firſt is the piece C E D called the Y, from its repreſenting that letter inverted by its two ſhanks, E and D; on the upper part is a weight F, to be raiſed higher and lower, and fixed as occaſion requires. This Y is fixed very faſt upon the ſaid iron axle AB. 12. From the axle hangs a ſort of an iron ſtirrup, I K L G, by its two hooks I G, and having on the lower part two holes K L, through which paſſes a long iron pin L K, and keyed in the ſame. When this pin is put in, it is alſo paſſed through the two holes in the ends E N of the horizontal fork or ſpanner E Q N, joined at its end Q to the handle of the regulator V 10. From Q to O are ſeveral holes, by which the ſaid handle may be fixed to that part of the end which is moſt convenient. 13. Upon the axis A B is fixed at right angles to the Y an handle or lever G 4, which goes on the outſide of the piece Q Q, and lies between the pins. Another handle is alſo faſtened upon the ſame axle, *viz.* H 5, and placed at half a right angle to the former G 4: this paſſes through the ſlit of the piece Q Q, lying on one of its pins. Hence we ſee that when the working beam goes up, its pin in the ſlit lifts up the ſpanner H 5, which turns about the axle ſo faſt, as to throw the Y with its weight F from C to 6, in which direction it would continue to move after it paſſed the perpendicular, were it not prevented by a ſtrap of leather fixed to it at *æ*, and made faſt at the ends *m* and *n*, in ſuch manner as to allow the Y to vibrate backwards and forwards about a quarter of a circle, at equal diſtance on this ſide and that of the perpendicular. 14. As things are repreſented in the figure, the regulator is open, its plate T Y being ſhewn on one ſide of the pipe S, which joins the cylinder and boiler. The piſton is now up, and alſo the working beam near its greateſt height, the pin in the ſlit has ſo far raiſed the ſpanner H 5, that the weight F on the head of the Y is brought ſo far from *n*, as to be paſt the perpendicular and ready to fall over towards *m*, which when it does, it will by its ſhank E, ſtrike the iron pin K L with a ſmart blow, and drawing the fork O N horizontally towards the beam Q, will draw the end 10 of the regulator towards *t*, and thereby ſhut it, by ſlipping the plate Y under the holes of the throat-pipe S. 15. Immediately after the regulator is ſhut, the beam riſing a little higher with its pin *S* on the outſide upon the lower part, lifts up the end *i* of the handle of the injecting-cock, and opens it by the turning of the two parts with teeth. The jet immediately making a vacuum, the beam again deſcends, and the pin *r* depreſſing the handle *k i*, ſhuts the injection-cock; and the beam continuing to deſcend, the pin *p* bears down the handle G 4, and throwing back the Y,

STEAM ENGINE.



its ſhank D throws forward the fork N Q, and again opens the regulator to receive freſh ſteam. After this every thing returns as before, and thus is the engine moſt wonderfully contrived to work itſelf.

16. Many years after the engine had been made, as above deſcribed, it received another improvement of very great advantage, and that was, inſtead of feeding the boiler with warm water, from the top of the cylinder (*ibid.* n° 1.) by the pipe W above, and F *f* below, they contrived to ſupply it with the ſcalding hot water which came out of the eduction-pipe *d* T Y, which now, inſtead of going into the waſte well at Y, was turned into the boiler on the top, and as the eduction-pipe before went out at the ſide of the cylinder, it was now inſerted in the bottom of it; and though the preſſure of the ſteam in the boiler be ſomewhat ſtronger than in the cylinder, yet the weight of water in the eduction-pipe being added to the force of ſteam in the cylinder will carry the water down continually, by overcoming the reſiſtance in the boiler.

This is the lever-engine with the improvements of Mr. Newcomen and others; but as captain Savary's, or rather the marquis of Worceſter's, is very cheap in reſpect of this machine, and as it is alſo applicable with great advantage when the heighth to which the water is to be raiſed does not exceed 100 or 150 feet, we ſhall here ſubjoin a view of that engine, with the improvements of Dr. Deſaguliers.

The boiler B B (plate XCII.) is a large copper body of a globular form, which will beſt of all withſtand the very great force of ſteam that in this caſe is neceſſary. Round the body of this boiler the fire and flame are conducted as ſhewn at T T T. It has a copper-cover ſcrewed on, which contains the ſteam-pipe C D, and two gage-pipes *n*, *o*, which by turning their cocks, ſhew the height of the water within as in the other engine. On the ſame cover P is a valve, over which lies a ſteel-yard, with its weight Q to keep it down, the ſtrength of the vapour being this way moſt exactly eſtimated. For being in the nature of a lever of the third ſort, it is plain, if the beam of the lever be divided into ten equal parts, and the firſt of them be upon the middle of the valve, and the weight Q hangs at the 2d, 3d, 4th, &c. diviſions, that then the force of the ſteam which can raiſe up the valve will be 2, 3, 4, &c. times as great as the weight. If the area of the valve be a ſquare inch, and Q = 15 lib. hanging at the ſecond diviſion is raiſed by a ſteam puſhing up the valve, it will ſhew that the ſteam will then preſs with the force of two atmoſpheres, and ſo on to ten atmoſpheres; but great care muſt be then taken that the ſteam ſo very ſtrong burſt not the boiler to pieces. The ſteam is carried from the boiler to a copper-veſſel A, by means of the pipe C D, and is let into it by turning the handle K of the ſteam-cock D I. The key of this cock is kept down by the ſcrew L, held up by the gibbet D L. The handle turned from K to *k* admits a paſſage to the ſteam into the copper-receiver A. This receiver A communicates at bottom with the ſucking pipe Z H going down to the water H in the well X, and above with the forcing pipe E E, which goes up a little above the water of the reſervoir R, and between theſe pipes are two valves F and G both opening upwards. The ſteam being let in upon the water of the receiver A, forces it up through the valve F, and the pipe E E to the reſervoir, and then the receiver is full of hot ſteam. This ſteam in the receiver is condenſed by a jet of cold water coming from the forcing pipe by the ſmall pipe M I, being let in and ſhut off by the cock at M. The ſteam being condenſed by this jet will be reduced within a very ſmall ſpace, and ſo make a vacuum, upon which the water in the well will ruſh up the forcing pipe to reſtore the equilibrium, and thus again fill the receiver A, the little air being compreſſed within a ſmall compaſs at the top above *b c*. That there may be always water in the force-pipe for the jet, there is a little pipe which brings the water to it from the reſervoir with the ſmall ſtop-cock Y, to ſhut it off upon occaſion. The valves at F and G are examined at any time by unſcrewing the pin 1 to looſen the ſtrap 2, and let down the flanch 3, all which parts are ſhewn larger in the figures n° 5. By the particular contrivance of the cock at D I, and its key, the water is made to paſs from the force-pipe to the boiler to ſupply the waſte in ſteam. This is plainly ſhewn in the ſections of the cock and key, where 5 is the top of the key, 6 is a hole on one ſide, which goes down to the bottom to convey the ſteam, or jet of water alternately to the receiver; 7 is a notch on the other ſide to take in the water from the force pipe, and conduct it to the boiler B. How this is done is eaſy to conceive from a view of the two ſections of the cock and key, in two poſitions within it. The boiler may hold about five or ſix hogſheads, and the receiver one hogſhead. It will work four or five hours without recruiting: about four ſtrokes a minute will produce upwards of 200 hogſheads per hour. This ſteam makes a vacuum ſo effectually, as to raiſe water from the well to the height of twenty-nine or thirty feet; and ſuppoſe the ſteam able to lift up the ſteelyard with its weight hanging at the 6th diviſion, it will then be able to raiſe a column of water above fifty yards high, as being then ſix times ſtronger than the preſſure of the atmoſphere, as is eaſily underſtood from what has been ſaid upon the fire-engine, the water being raiſed in a ſimilar manner in both machines, there by the preſſure of condenſed elaſtic air, and here by the preſſure of rarefied elaſtic ſteam. See the article ENGINE *for extinguiſhing fires.*

This engine conſiſts of ſo few parts, that it comes very cheap in proportion to the water that it raiſes, but it has its limits. On the other hand, the lever-engine, often called Newcomens, has its limits alſo; that is, it muſt not be too ſmall, for then it will have a great deal of friction in proportion to the water that it raiſes, and will coſt too dear; having as many parts as the largeſt machines, which are the beſt and cheapeſt in proportion to the water they raiſe.

In the Philoſophical Tranſactions there is an account of an improvement made in the ſteam-engine by Mr. Payne, as follows. He has contrived two iron-pots or veſſels of a conical form inverted as repreſented by A B E F (n° 6.) on the upper-head of which is fixed a globular copper-head, of about 5 ½ feet diameter, as L M N. Then there is placed on the inſide a ſmall machine H, called the diſpenſer, with ſpouts *a b c d e*, &c. round the ſides fixed to it, and the bottom thereof reſts on a center pin O. In this machine is fixed an upright tube G with holes at the bottom, and a funnel P on the top, to receive a ſpout of water from a conduit-pipe Q, by the ſtop-cock R. Two or more of theſe veſſels are placed in a reverberatory arch for conveying the intenſe heat of a ſtrong fire, the flame whereof encompaſſes the iron-veſſels, and keeps them in a red heat during the time of their uſe, at which time the cog-wheel I being turned by proper machinery, whirls the diſpenſer about with great velocity, and cauſes the water in it to fly through the ſpouts againſt the ſides of the red hot pots. By this means, the greateſt part of the water is converted into vapour or elaſtic ſteam, which is conveyed by a common pipe and cock to the barrel of the engine to put the piſton in motion, and the waſte water is conveyed away at bottom by means of a pipe C D, with a valve at D to keep out the air.

Before we conclude the ſubject of ſteam-engines, we ſhall add a moſt curious and uſeful table of the calculation of the power of the lever-engines, for the various diameters of the cylinder, or ſteam-barrel, and bore of the pump, that are capable of raiſing water from 48 to 440 hogſheads *per* hour, at any depth from 15 to 100 yards. It was compoſed by Henry Beighton, and is founded on this principle, that the ale-gallon of 282 cubic inches of water weighs 10 ℔. 3 ℥. averdupois, and a ſuperficial ſquare inch is preſſed with the weight of 14 ℔. 13 ℥. of air, when the mercury ſtands at a medium in the barometer. But allowing for ſeveral frictions, and to give a conſiderable velocity to the engine, it is found by experience that no more than 8 ℔. of preſſure muſt be allowed to an inch ſquare on the piſton in the cylinder, that it may make about ſixteen ſtrokes in a minute at about ſix feet to each ſtroke. This calculation is but the ordinary power in practice, for with large boilers the piſton will make twenty or twenty-five *per* minute, and each of them ſeven or eight feet; and then a pump of nine inches bore will diſcharge more than 320 hogſheads *per* hour, and for other ſizes proportionably.

Table ſhewing the Diameter of the Cylinder and Bore of the Pump that is capable of raiſing any Quantity of Water, from 48 to 440 Hogſheads an Hour, at any Depth from 15 to 100 Yards.

Diameter of the bore.	will hold in a yard.	will draw by ſix feet ſtroke.	weight in one yard.	at 16 ſtrokes a minute.	63 gal. to a hogſhead.		in one hour.		Diameter of the cylinder in inches. The depths in yards.												
inch.	gallons	gallons	pounds avoird.	gallons	hhd.	gall.	hhd.	gall.	15	20	25	30	35	40	45	50	60	70	80	90	100
12	14.4	28.8	146.	462.	7	21	440		18½	21¾	24	26½	28½	30½	32½	34¼	37¼	40			
11	12.13	24.	123.5	338.	6	20	369	3	17	19¾	22	24¾	26¼	28	29¾	31¼	34¼	37	39½		
10	10.02	20.04	102.	320.	5	5	304	48	15½	18	20	22	23¾	25¼	27	28¾	31¼	33¾	36	38½	40
9	8.12	16.2	82.7	259.8	4	7	247	7	14	16¼	18	20	21½	23	24½	25	28	30½	33	35	36½
8½	7.26	14.5	73.9	232.3	3	43	221	15	13½	15¼	17¼	19	20¼	21¾	23	24	26¼	28½	31	32½	35¼
8	6.41	12.8	65.3	205.2	3	16	195	22	12½	14½	16½	18½	19	20½	21½	23	25	27	29	30½	32½
7¾	6.01	12.2	61.2	192.3	3	2	182	13	12	14	15½	17½	18¾	19¾	21	22	24¼	26	28	29½	31½
7½	5.66	11.3	57.6	181.1	2	55	172	30	11	13¾	15	16½	18	19	20	21¼	23¼	25	27	28½	30¼
7	4.91	9.8	50.0	157.1	2	31	149	40	10¾	13	14	15½	16¾	18¾	19	20½	22	24	25½	27	28½
6½	4.23	8.4	43.0	135.3	2	9	128	54	10	12	13	14	15½	16¼	18	19	20	22	23	24½	26¼
6	3.61	7.2	36.7	115.5	1	52	110	1	9½	11	12	13	14	15½	16	17	19	20½	22	23	24½
5½	3.13	6.2	31.8	99.2	1	36	94	30		10	11	12	13	14	15	15¾	17	19	20	21	22¼
5	2.51	5.0	25.5	80.3	1	7	66	61			10	11	11¾	13	13¾	14	15½	16¾	18½	19¼	20¼
4½	2.02	2.4	20.5	64.6	1	1	60	60				10	11	11¾	12	13½	14	15	16	17	18¼
4	1.6	3.2	16.2	51.2	0	51	48	51					9	10	11	11½	12	13½	14	15	16

An example of the uſe of the table. Suppoſe it were required to draw 150 hogſheads *per* hour, at 90 yards deep: in the ſeventh column I find the neareſt number 149 hogſheads; and againſt it, in the firſt column, I find a ſeven inch bore; then, under 90, the depth, on the right in the ſame line, I have 27 inches, the diameter of the cylinder fit for that purpoſe: and ſo for any other.

Tanning-ENGINE. See the article TANNING-ENGINE.

Water-ENGINES, thoſe made for raiſing water: ſuch is the ſteam-engine, already deſcribed. See alſo WATER-WORKS.

ENGINEER, or INGINEER, properly denotes a contriver, or maker, of engines. See the preceding article.

ENGINEER, in the military art, an able, expert man, who, by a perfect knowledge in mathematics, delineates upon paper, or marks upon the ground, all ſorts of forts, and other works proper for offence and defence. He ſhould underſtand the art of fortification, ſo as to be able, not only to diſcover the defects of a place, but to find a remedy proper for them, as alſo how to make an attack upon, as well as to defend, the place. Engineers are extremely neceſſary for theſe purpoſes: wherefore it is requiſite that, beſides being ingenious, they ſhould be brave in proportion. When at a ſiege the engineers have narrowly ſurveyed the place, they are to make their report to the general, by acquainting him which part they judge the weakeſt, and where approaches may be made with moſt ſucceſs. Their buſineſs is alſo to delineate the lines of circumvallation and contravallation, taking all the advantages of the ground; to mark out the trenches, places of arms, batteries, and lodgments, taking care that none of their works be flanked or diſcovered from the place. After making a faithful report to the general of what is a doing, the engineers are to demand a ſufficient number of workmen and utenſils, and whatever elſe is neceſſary.

ENGLAND, the ſouthern diviſion of Great Britain, ſituated in the Atlantic ocean, between 2° eaſt and 6° weſt longitude, and between 49° 55′ and 55° 55′ north latitude.

There are in England, including Wales, fifty-two counties, two archbiſhoprics, twenty-four biſhoprics, two univerſities, twenty-nine cities, upwards of eight hundred towns, and near ten thouſand pariſhes; ſuppoſed to contain about 6,000,000 of people.

As to the polity, trade, law, civil and religious antiquities, &c. of England, their ſeveral branches are treated of under the articles PARLIAMENT, PRIVY-COUNCIL, COURT, CUSTOM-HOUSE, ADMIRALTY, &c.

***New*-ENGLAND**, comprehending the colonies of Maſſachuſets, New Hampſhire, Connecticut, Rhode-iſland, and Providence Plantation, is ſituated between 67° and 73° weſt longitude, and between 41° and 45° north latitude.

The provinces into which New-England is divided, have different conſtitutions, and generally different governors, who have a negative voice in the choice of the members who are to ſerve as their council; and beſides, all laws muſt be ſent to Old England to receive the approbation of the crown, and no act of government is valid without the governor's conſent in writing.

ENGLECERIE, ENGLESHIRE, or ENGLISHERY, an antient word ſignifying the being an engliſhman, which was uſed in the time of king Canutus, to diſtinguiſh the Engliſh from the Danes, eſpecially in the caſe of murder, and its puniſhment; as where a perſon was privately killed, ſuch a perſon was deemed francigena, which comprehended every alien, till englecerie was proved; that is to ſay, till he was made out to be an engliſhman, in which caſe the town, &c. wherein it was committed, was exempted from amercement, which it was liable to if the murderer of a dane eſcaped out of it unpuniſhed. The manner of proving the party ſlain to be an engliſhman, was before the coroner, by two men that knew his father, and two women that knew his mother. This was taken away by ſtatute 14 Edw. III. c. 4.

ENGLISH, or the ENGLISH-TONGUE, the language ſpoken by the people of England, and, with ſome variation, by thoſe of Scotland, as well as part of Ireland, and the reſt of the britiſh dominions.

The antient language of Britain is generally allowed to have been the ſame with the gaulic, or french; this iſland, in all probability, having been firſt peopled from Gallia, as both Cæſar and Tacitus affirm, and prove by many ſtrong and concluſive arguments, as their religion, manners, cuſtoms, and the nearneſs of their ſituation. But now we have very ſmall remains of the antient britiſh tongue, except in Wales, Cornwall, the iſlands and highlands of Scotland, part of Ireland, and ſome provinces of France; which will not appear ſtrange, when what follows is conſidered.

Julius Cæſar, ſometime before the birth of our Saviour, made a deſcent upon Britain, though he may be ſaid rather to have diſcovered than conquered it; but, about the year of Chriſt forty-five, in the time of Claudius, Aulus Plautius was ſent over with ſome roman forces, by whom two kings of the Britons, Codigunus and Caractacus, were both overcome in battle: whereupon a roman colony was planted at Malden in Eſſex, and the ſouthern parts of the iſland were reduced to the form of a roman province: after that, the iſland was conquered as far north as the Friths of Dumbarton and Edinburgh, by Agricola, in the time of Domitian; whereupon, a great number of the Britons, in the conquered part of the iſland, retired to the weſt part called Wales, carrying their language with them.

The greateſt part of Britain being thus become a roman province, the roman legions, who reſided in Britain for above two hundred years, undoubtedly diſſeminated the latin tongue; and the people being afterwards governed by laws written in Latin, muſt neceſſarily make a mixture of languages. This ſeems to have been the firſt mutation the language of Britain ſuffered.

Thus the britiſh tongue continued, for ſome time, mixed with the provincial latin, till, the roman legions being called home, the Scots and Picts took the opportunity to attack and harraſs South Britain: upon which, K. Vortigen, about the year 440, called the Saxons to his aſſiſtance, who came over with ſeveral of their neighbours, and having repulſed the Scots and Picts, were rewarded for their ſervices with the iſle of Thanet, and the whole county of Kent: but growing too powerful, and not being contented with their allotment, diſpoſſeſſed the inhabitants of all the country on the eaſt ſide of the Severn: thus the britiſh tongue was in a great meaſure deſtroyed, and the Saxon introduced in its ſtead.

What the ſaxon tongue was long before the conqueſt, about the year 700, we may obſerve in the moſt antient manuſcript of that language, which is a gloſs on the Evangeliſts, by biſhop Eadfride, in which the three firſt articles of the Lord's prayer run thus.

" Uren fader thic arth in heofnas, ſic
" gehalgud thin noma, ſo cymeth thin
" ric. Sic thin willa ſue is heofnas, and
" in eortho, &c."

In the beginning of the ninth century, the Danes invaded England, and getting a footing in the northern and eaſtern parts of the country, their power gradually increaſed, and they became ſole maſters of it in about two hundred years. By this means the antient engliſh obtained a tincture of the daniſh language: but their government, being of no long continuance, did not make ſo great an alteration in the Anglo-ſaxon, as the next revolution, when the whole land, *A. D.* 1067, was ſubdued by William the Conqueror, duke of Normandy in France: for the Normans, as a monument of their conqueſt, endeavoured to make their language as generally received as their commands, and thereby rendered the engliſh language an entire medley.

About the year 900, the Lord's prayer in the antient Anglo-ſaxon, ran thus:

" Thu ure fader the eart on heofenum,
" ſi thin nama gehalgod; cume thin
" rice ſi thin willa on eorthan ſwa, ſwa
" on heofenum, &c."

About the year 1160, under Hen. II. it was rendered thus by pope Adrian, an engliſhman, in rhyme:

" Ure fader in heaven rich,
" Thy name be hayled ever lich,
" Thou bring us thy michell bliſſe:
" Als hit in heaven y-doe
" Evar in yearth beene it alſo, &c."

Dr. Hickes gives us an extraordinary ſpecimen of the engliſh, as ſpoken in the year 1385, upon the very ſubject of the engliſh tongue.

" As it is knowe how meny maner
" peple beeth in this lond; there beeth
" alſo ſo many dyvers longages and
" tonges. Notheleſs Walſchemen and
" Scots that beeth nought medled with
" other nations, holdeth wel nyh hir
" firſte longage and ſpeche; but yif the
" Scottes that were ſometime confederat
" and woned with the Pictes drawe
" ſomewhat after hir ſpeche; but the
" Flemynges that woneth on the weſte
" ſide of Wales, haveth loſt her ſtrange
" ſpech and ſpeketh ſexonliche now.
" Alſo engliſhemen, they had from
" the bygynnynge thre maner ſpeche:
" northerne, ſoutherne, and middel
" ſpeche in the middel of the lond, as
" they come of three maner of peple of
" Germania: notheles by commyxtion
" and mellynge firſt with Danes, and
" afterwards with Normans in meny
" the contrary longage is apayred.
" (corrupted.)
" This apayrynge of the burthe of the
" tunge is bycauſe of tweie thynges;
" oon is for children in ſcole agenſt
" the uſuage and maner of all other
" nations, beeth compelled for to leve
" hire own longage, and for to con-
" ſtrue hir leſſons and here thynges in
" French, and ſo they haveth ſethe Nor-
" mans come firſt into Engelond. Alſo,
" gentlemen children beeth taught to
" ſpeke Frenſche from the tyme that
" they beeth rokked in here cradel, and
" kunneth ſpeke and play with a childes
" broche; and uplondiſſche men will
" lykne hymſelf to gentilmen, and
" fondeth with great beſyneſſe for to
" ſpeake Frenſche to be told of.---Hit
" ſeemeth a greet wonder how engliſche-
" men and her own longage and tonge
" is ſo dyverſe of ſown in this oon
" ilond: and the longage of Nor-

mandie is comlynge of another lond, and hath oon manner ſoun amonge alle men that ſpeketh hit arigt in Engelond. Alſo of the foreſaid ſaxon tonge that is deled (divided) a three, and is abide ſcarceliche with fewe uplondiſſche men is greet wonder. For men of the eſt, with men of the weſt, is, as it were, undir the ſame partie of hevene acordeth more in ſownynge of ſpeche, than men of the north, with men of the ſouth. Therefore it is that mercii, that beeth men of myddel Engelond, as it were, parteners of the endes, underſtondeth bettre the ſide longages northerne, and ſoutherne, than northerne or ſoutherne underſtondeth either other.—All the longage of the Northumbers and ſpechialliche at York, is ſo ſcharp, ſlitting and frotynge, and unſchape, that we ſoutherne men may that longage unnethe underſtonde, *&c.*"

Hickes's *Theſaur. liter. ſept.*

In the year 1537, the Lord's prayer was printed as follows: "O oure father which arte in heven, halowed be thy name: let thy kingdome come, thy will be fulfiled as well in erth as it is in heven; geve us this daye in dayly bred, *&c.*" Where it may be obſerved that the diction is brought almoſt to the preſent ſtandard, the chief variations being only in the orthography. By theſe inſtances, and many others that might be given, it appears, that the engliſh ſaxon language, of which the Normans deſpoiled us in a great meaſure, had its beauties, was ſignificant and emphatical, and preferable to what they impoſed on us. "Great, verily," ſays Camden, "was the glory of our tongue, before the norman conqueſt, in this, that the old engliſh could expreſs, moſt aptly, all the conceptions of the mind in their own tongue, without borrowing from any." Of this he gives ſeveral examples.

Having thus ſhewn how the antient britiſh language was, in a manner, extirpated by the Romans, Danes, and Saxons, and ſucceeded by the Saxon, and after that the Saxon blended with the Norman French, we ſhall now mention two other cauſes of change in the language: the firſt of theſe is owing to the Britons having been a long time a trading nation, whereby offices, dignities, names of wares, and terms of traffic are introduced, which we take with the wares from the perſons of whom we have them, and form them anew, according to the genius of our own tongue; and beſides this change in the language, ariſing from commerce, Britain's having been a conſiderable time ſubject to the ſee of Rome, in eccleſiaſtical affairs, muſt unavoidably introduce ſome italian words among us. Secondly, as to the particular properties of a language, our tongue has undergone no ſmall mutation, or rather has received no ſmall improvement upon that account: for, as to the Greek and Latin, the learned have, together with the arts and ſciences, now rendered familiar among us, introduced abundance; nay almoſt all the terms of art in the mathematics, philoſophy, phyſic, and anatomy; and we have entertained many more from the Latin, French, *&c.* for the ſake of neatneſs and elegancy: ſo that, at this day, our language, which about 1800 years ago, was the antient Britiſh, or Welſh, *&c.* is now a mixture of Saxon, Teutonic, Dutch, Daniſh, Norman, and modern French, embelliſhed with the Greek and Latin. Yet this, in our opinion, is ſo far from being a diſadvantage to the engliſh tongue, as now ſpoke (for all languages have undergone changes, and do continually participate with each other) that it has ſo enriched it, as now to become the moſt copious, ſignificant, fluent, courteous, amorous and maſculine language in Europe, if not in the world: This, indeed, was Camden's opinion of it in his time, and Dr. Heylin's in his time: if then the engliſh tongue, in the opinion of theſe learned authors, deſerved ſuch a character in their days, how much more now, having ſince received ſo conſiderable improvements from ſo many celebrated writers.

ENGONASIS, a name given to the conſtellation Hercules. See HERCULES.

ENGRAFTING, or GRAFTING, in gardening. See the article GRAFTING.

ENGRAILED, or INGRAILED, in heraldry, a term derived from the french *greſly*, hail; and ſignifying a thing the hail has fallen upon and broke off the edges, leaving them ragged, or with half rounds, or ſemicircles, ſtruck out of their edges.

ENGRAVING, the art of cutting metals and precious ſtones, and repreſenting thereon figures, letters, or whatever device, or deſign, the artiſt fancies.

Engraving, properly a branch of ſculpture,

ture, is divided into ſeveral other branches, according to the matter whereon it is employed, and the manner of performing it.

The original way of engraving on wood is denominated, at preſent, with us, by cutting in wood; that on metals with aquafortis, is named etching; that by the knife, burniſher, punch, and ſcraper, is called mezzotinto; that on ſtones for tombs, *&c.* ſtone-cutting; and that performed with the graver, on metals or precious ſtones, keeps alone the primitive name of engraving, being that which we ſhall at preſent attend to. See the articles CUTTING, ETCHING, MEZZOTINTO, and SCULPTURE.

ENGRAVING *on copper* is employed in repreſenting portraits, hiſtories, landſkips, foliages, figures, buildings, *&c.* either after paintings, or deſigns, for that purpoſe. See DESIGN and PAINTING.

It is performed with the graver on a plate of copper, which, being well poliſhed, is covered over thinly with virgin-wax, and then ſmoothed, while warm, with a feather, ſo that the wax be of an equal thickneſs on the plate; and on this the draught or deſign, done in black lead, red chalk, or ungummed ink, is laid with the face of the drawing on the wax: then they rub the backſide, which will cauſe the whole deſign of the drawing to appear on the wax. The deſign, thus transferred, is traced through on the copper, with a point, or needle; then heating the plate, and taking off the wax, the ſtrokes remain to be followed, heightened, *&c.* according to the tenor of the deſign, with the graver, which muſt be very ſharp, and well pointed. See the article GRAVER.

In the conduct of the graver conſiſts almoſt all the art, which depends not ſo much upon rules as upon practice, the habitude, diſpoſition, and genius of the artiſt, the principles of engraving being the ſame with thoſe of painting; for if an engraver be not a perfect maſter of deſign, he can never hope to arrive at a degree of perfection in this art. In conducting the ſtrokes, or cuts, of the graver, he muſt obſerve the action of the fingers, and of all their parts, with their outlines; and remark how they advance towards, or fall back from his ſight, and then, conduct his graver, according to the riſings or cavities of the muſcles, or folds, widening the ſtrokes in the light, and contracting them in the ſhades; as alſo at the extremity of the outlines, to which he ought to conduct the cuts of the graver, that the figures or objects repreſented, may not appear as if they were gnawn; and lightening his hand, that the outlines may be perfectly ſound, without appearing cut or ſlit; and although his ſtrokes neceſſarily break off where a muſcle begins, yet they ought always to have a certain connection with each other, ſo that the firſt ſtroke ſhould often ſerve to make the ſecond, becauſe this will ſhew the freedom of the graver.

If hair be the ſubject, let the engraver begin his work by making the outlines of the principal locks, and ſketch them out in a careleſs manner, which may be finiſhed, at leiſure, with finer and thinner ſtrokes to the very extremities.

The engraver muſt avoid making very acute angles, eſpecially in repreſenting fleſh, when he croſſes the firſt ſtrokes with the ſecond, becauſe it will form a very diſagreeable piece of tabby-like lattice-work, except in the repreſentation of ſome clouds, in tempeſts, the waves of the ſea, and in repreſentations of ſkins of hairy animals, and leaves of trees. So that the medium between ſquare and acute ſeems to be the beſt and moſt agreeable to the eye. He that would repreſent ſculpture, muſt remember that, as ſtatues, *&c.* are moſt commonly made of white marble, or ſtone, whoſe colour does not produce ſuch dark ſhades as other matters do, have no black to their eyes, nor hair of the head, and beard flying in the air. If the engraver would preſerve one quality and harmony in his works, he ſhould always ſketch out the principal objects of his piece before any part of them are finiſhed.

The inſtruments neceſſary for this ſort of engraving are, beſides a graver, a cuſhion, or ſand bag, made of leather, to lay the plate on, in order to give it the neceſſary turns and motions; a burniſher made of iron, or ſteel, round at one end, and uſually flattiſh at the other, to rub out ſlips and failures, ſoften the ſtrokes, *&c.* a ſcraper, to pare off the ſurface, on occaſion; and a rubber of a black hat, or cloth rolled up, to fill up the ſtrokes that they may appear the more viſible.

In engraving on precious ſtones, they uſe either the diamond or the emery. The diamond, which is the hardeſt of all ſtones, is only cut by itſelf, or with its own matter. The firſt thing to be done in this branch of engraving, is to cement two rough diamonds to the ends of two ſticks big enough to hold them ſteady in the hand, and to rub or grind them, againſt each other, till they be brought to the form deſired. The duſt, or powder that is rubbed off ſerves afterwards to poliſh them, which is performed with a kind of mill that turns a wheel of ſoft iron. The diamond is fixed in a braſs diſh, and, thus applied to the wheel, is covered with diamond-duſt, mixt up with oil of olives; and when the diamond is to be cut facet-wiſe, they apply firſt one face, then another, to the wheel. Rubies, ſapphires, and topazes, are cut and formed the ſame way on a copper wheel, and poliſhed with tripoli diluted in water. As to agates, amethyſts, emeralds, hyacinths, granates, rubies and others of the ſofter ſtones, they are cut on a leaden wheel, moiſtened with emery and water, and poliſhed with tripoli on a pewter wheel. Lapis-lazuli, opal, *&c.* are poliſhed on a wooden wheel. To faſhion and engrave vaſes of agate, cryſtal, lapis-lazuli, or the like, they make uſe of a kind of lathe, like that uſed by pewterers to hold the veſſels, which are to be wrought with proper tools; that of the engraver generally holds the tools, which are turned by a wheel; and the veſſel is held to them to be cut and engraved, either in relievo or otherwiſe; the tools being moiſtened, from time to time, with diamond-duſt and oil; or, at leaſt, emery and water. To engrave figures or devices on any of theſe ſtones, when poliſhed, ſuch as medals, ſeals, *&c.* they uſe a little iron wheel, the ends of whoſe axis are received within two pieces of iron, placed upright, as in the turner's lathe; and to be brought cloſer, or ſet further apart, at pleaſure: at one end of the axis are fitted the proper tools, being kept tight by a ſcrew. Laſtly, the wheel is turned by the foot, and the ſtone applied by the hand to the tool, and is ſhifted and conducted as occaſion requires.

The tools are generally of iron, and ſometimes of braſs: their form is various, but it generally bears ſome reſemblance to chiſſels, gouges, *&c.* Some have ſmall round heads, like buttons, others like ferrels, to take the pieces out, and others flat, *&c.* when the ſtone has been engraven, it is poliſhed on wheels of hair-bruſhes and tripoli.

ENGRAVING *on ſteel* is chiefly employed in cutting ſeals, punches, matrices, and dyes proper for ſtriking coins, medals, and counters. The method of engraving with the inſtruments, *&c.* is the ſame for coins as for medals and counters: All the difference conſiſts in their greater or leſs relievo, the relievo of coins being much leſs conſiderable than that of medals, and that of counters ſtill leſs than that of coins.

Engravers in ſteel commonly begin with punches, which are in relievo, and ſerve for making the creux, or cavities, of the matrices, and dyes: though ſometimes they begin with the creux, or hollowneſs, but then it is only when the intended work is to be cut very ſhallow.

The firſt thing done, is that of deſigning the figures; the next is the moulding them in wax, of the ſize and depth they are to lie, and from this wax the punch is engraven. When the punch is finiſhed they give it a very high temper, that it may the better bear the blows of the hammer with which it is ſtruck to give the impreſſion to the matrix. See the articles PUNCH and MATRIX.

The ſteel is made hot to ſoften it, that it may the more readily take the impreſſion of the punch; and after ſtriking the punch on it, in this ſtate, they proceed to touch up or finiſh the ſtrokes and lines, where, by reaſon of their fineneſs, or the too great relievo, they are any thing defective, with ſteel gravers of different kinds, chiſſels, flatters, *&c.* being the principal inſtruments uſed in graving on ſteel.

The figure being thus finiſhed, they proceed to engrave the reſt of the medal, as the mouldings of the border, the engrailed ring, letters, *&c.* with little ſteel punches, well tempered, and very ſharp.

ENGROSSING, or INGROSSING. See the articles INGROSSER and INGROSSING.

ENGUICHE', in heraldry, is ſaid of the great mouth of a hunting horn, when its rim is of a different colour from that of the horn itſelf.

ENHARMONIC, in the antient muſic, one of their genera or kinds of muſic, ſo called from its ſuperior excellence; tho' wherein it conſiſted, ſays Mr. Malcom, is hard to ſay: it was allowed by all to be ſo very difficult, that few could ever practiſe it.

Others ſay it is a ſpecies of muſic, the modulation whereof proceeds by intervals leſs than ſemitones; as the ſemitone minor, enharmonic dieſis, and third major. See SEMITONE, DIESIS, and THIRD.

This genus, ſays Broſſard, was greatly uſed in the greek muſic, eſpecially in dramatic performances. But as thoſe almoſt inſenſible elevations and fallings of the voice, whereof it conſiſts, are too difficult, and as they ſometimes make the concord falſe, it has been laid aſide, and even loſt, though ſeveral great authors have made many attempts to recover it. See the articles GENUS, INTERVAL, and SYSTEM.

ENHERITANCE, or INHERITANCE. See the article INHERITANCE.

ENHYDRUS, in natural hiſtory, a genus of ſiderochita or cruſtated ferrugineous bodies, formed in large and in great part empty caſes, incloſing a ſmall quantity of an aqueous fluid.

Of this genus there are only two ſpecies. 1. The thick-ſhelled enhydrus, with black, reddiſh-brown, and yellow cruſts. 2. The thinner-ſhelled kind, with yellowiſh-brown, and purple cruſts; neither of which ferments with aqua fortis, or gives fire with ſteel.

ENIGMA, or ÆNIGMA. See the article ÆNIGMA.

ENIXUM, among chemiſts, a kind of neutral ſalt, generated of an acid and an alkali.

The ſal enixum of Paracelſus, is the caput mortuum of ſpirits of nitre with oil of vitriol, or what remains in the retort after the diſtillation of this ſpirit; being of a white colour, and pleaſing acid taſte. If this be diſſolved in hot water, and cryſtallized, it will be a yet more pleaſant medicine, agreeing in virtues with vitriolated tartar. It is diuretic, and may be given from a ſcruple to a dram, in broth or water-gruel.

ENLARGE, in the manege, is to make a horſe go large, or embrace more ground than he before covered.

To this purpoſe you ſhould prick with both heels, or aid him with the calves of the legs, and bear your hand outwards; or rather prick him with the inner heel, ſuſtaining him with the outer leg, in order to preſs him forwards, and make his ſhoulders go.

ENMANCHE', in heraldry, is when lines are drawn from the center of the upper edge of the chief to the ſides, to about half the breadth of the chief; ſignifying ſleeved, or reſembling a ſleeve, from the french *manche*.

ENNEADECAETERIS, in chronology, the name by which the Greeks called the lunar cycle of nineteen years. See the article CYCLE.

ENNEAGON, in geometry, a polygon with nine ſides. See the article POLYGON.

ENNEAHEDRIA, in natural hiſtory, a genus of columnar, cryſtalliform, and double-pointed ſpars, compoſed of a trigonal column, terminated at each end by a trigonal pyramid.

Of this genus there are ſeveral ſpecies, diſtinguiſhed by the length or ſhortneſs of the column and pyramids, none of which will give fire with ſteel, but all of them ferment with aqua-fortis. See the article SPAR.

ENNEANDRIA, in botany, a claſs of plants with hermaphrodite flowers, and nine ſtamina or male parts in each. See the article BOTANY.

To this claſs belong the laurus, rheum, ſpondias, and butomus. See the articles LAURUS, *&c.*

ENS, among metaphyſicians, denotes entity, being, or exiſtence: this the ſchools call *ens reale*, and *ens poſitivum*, to diſtinguiſh it from their *ens rationis*, which is only an imaginary thing, or exiſts only in the imagination.

ENS, among chemiſts, imports the power, virtue, and efficacy which certain ſubſtances exert upon our bodies. Paracelſus ſpeaks much of the *ens primum* of minerals, gems, herbs, and liquors: by which he means, the parts in which their virtues reſide, or the very virtue or efficacy itſelf. Authors relate wonders of the renovating power of the *ens primum* of baum, and other plants, which is different in each kind.

ENS VENERIS, the ſublimate of equal quantities of dulcified calx of vitriol, and the dried flowers of ſal ammoniac, a ſmall proportion of which turns a large one of the infuſion of galls black: it is red, ſaline, and aſtringent; and ſaid to be an excellent medicine in diſtempers ariſing from a weakneſs of the ſolids, as the rickets, and the like.

ENS, in geography, a city of Germany, ſituated at the confluence of the Danube and the river Ens, about eighty miles ſouth of Vienna: eaſt long. 14° 20′, north lat. 48° 16′.

ENSIFORM, in general, ſomething reſembling a ſword, *enſis*: thus we find mention of enſiform leaves, enſiform cartilage, &c. See LEAF and XIPHOIDES.

ENSIGN, in the military art, a banner under which the ſoldiers are ranged according to the different companies or parties they belong to. See the articles COLOURS, FLAG, STANDARD, &c.

The european enſigns are pieces of taffety with various figures, arms, and devices painted on them, in different colours: the turkiſh enſigns are horſes-tails.

ENSIGN is alſo the officer that carries the colours, being the loweſt commiſſioned officer in a company of foot, ſubordinate to the captain and lieutenant. It is a very honourable and proper poſt for a young gentleman at his firſt coming into the army: he is to carry the colours both in aſſault, day of battle, &c. and ſhould not quit them but with his life: he is always to carry them himſelf on his left ſhoulder: only on a march he may have them carried by a ſoldier. If the enſign is killed, then the captain is to carry the colours in his ſtead.

ENSISHEIM, a town of Germany, in the langraviate of Alſace, about fifty miles ſouth of Straſburg: eaſt long. 7° 30′, north lat. 47° 50′.

ENSKIRKEN, a town of Germany, fifteen miles ſouth-weſt of Cologn.

ENTABLATURE, or ENTABLEMENT, in architecture, is that part of an order of a column, which is over the capital, and comprehends the architrave, frieze, and corniche.

The entablature is alſo called the trabeation, and ſeems borrowed from the latin, *trabs*, a beam; though others derive it from *tabulatum*; a ceiling, becauſe the frieze is ſuppoſed to be formed by the ends of the joiſts which bear upon the architrave.

It is different in different orders; for notwithſtanding that it conſiſts of the three above mentioned diviſions in all, yet theſe parts are made up of more or fewer particular members or ſubdiviſions, according as the order is more or leſs rich. Vignola makes the entablature a quarter of the height of the whole column in all the orders. In the tuſcan and doric, the architrave, frieze, and corniche, are all of the ſame height. In the ionic, corinthian, and compoſite, the whole entablature, being of fifteen parts, five of theſe go to the architrave, four to the friezes, and ſix to the corniche. See the articles TUSCAN, DORIC, &c.

Mr. le Clerc obſerves, that were we to regard only the laws of ſtrength and weakneſs, we ſhould rather diminiſh the entablatures of ſuch columns as have pedeſtals, than thoſe which have none. As to the projecture of the entablature, it ſhould never be forgot, that its principal deſign is to ſhelter what is underneath.

ENTABLATURE, in maſonry, is uſed ſometimes to denote the laſt row of ſtones on the top of the wall of a building, on which the timber and covering reſt. This is often made to project beyond the naked of the wall, to carry off the rain.

ENTABLER, in the manege, the fault of a horſe whoſe croupe goes before his ſhoulders in working upon volts; which may be prevented by taking hold of the right rein, keeping your right leg near, and removing your left leg as far from the horſe's ſhoulder as poſſible.

This is always accompanied with another fault called aculer. See ACULER.

ENTAIL, in law, is a fee eſtate entailed; that is, abridged and limited to certain conditions preſcribed by the donor or grantor. See the articles FEE, RECOVERY, and TAIL.

ENTÉ, in heraldry, a method of marſhalling more frequent abroad than with us, and ſignifying grafted or ingrafted.

We have, indeed, one inſtance of enté in the fourth grand quarter of his majeſty's royal enſign, whoſe blazon is Brunſwick and Lunenburg impaled with antient Saxony, *ente en pointe*, grafted in point.

ENTELECHIA, εντελεχεια, a word uſed by Ariſtotle to expreſs the ſoul, and which, not occurring in any other author, has given the commentators upon that philoſopher great trouble to diſcover its true meaning. See the article SOUL.

Hemolaus Barbarus is even ſaid to have conſulted the devil about it, after which, in his paraphraſe on Themiſtius, either from the devil or himſelf, renders it *perfectihabia*, which is nothing clearer.

Cicero, whoſe interpretation of this word ſhould be eſteemed preferable to that of any modern writer, defines entelechia *quædam quaſi continuata & perennis motio*, a certain continued and perpetual motion: whence it would appear, that Ariſtotle took the ſoul for a mode of the body, a continuous and perpetual motion being undoubtedly a mode of body. The vulgar peripatetics hold entelechia to ſignify act, and under it ſuppoſe the form of the compound or animal to be underſtood. The lateſt peripatetics agree, that the act, or entelechia, whereby Ariſtotle meant to explain the nature of the ſoul, is either ſome mode of the body, or it is nothing at all.

ENTERING *of a hawk*, among ſportſmen, the letting her kill for the firſt time.

ENTERING *of hounds*, is the inſtructing them how to hunt. See ENTRANCE.

ENTEROCELE, ἐντεροκηλη, in ſurgery, a tumour formed by a prolapſion of the inteſtines through the rings of the abdomen, and proceſſes of the peritonæum, into the ſcrotum. It is ſometimes termed an oſcheocele and complete hernia, in contradiſtinction to the bubonocele. See the article BUBONOCELE, *&c.*

This diſorder ariſes from a violent diſtention of the peritonæum and rings of the abdominal muſcles, through which the inteſtine prolapſes into the ſcrotum; and proceeds from ſome violence by a fall, blow, or ſtraining to leap, lift up great weights, vomiting, *&c.* and according to the nature of the cauſe, the rupture is formed, either inſtantly or imperceptibly by degrees. This rupture is always attended with pains, and uſually happens but in one ſide, never in both at a time: ſometimes the inteſtine alone falls down; at other times, it is accompanied with the omentum. The tumour appears ſoft to the touch like an inteſtine, or bladder, diſtended with wind: it firſt appears ſmall in the inguen, and gradually deſcends down to the teſticle of the ſame ſide in the ſcrotum, which is thereby ſometimes diſtended half way down the thigh, and even down to the knee: the other ſymptoms are the ſame with thoſe of the bubonocele.

The tumour is encreaſed by crying, plentifully eating, lifting, or carrying any burden; it is contracted with cold, and dilated with heat: it may be diſtinguiſhed generally from the hydrocele or pneumatocele, by its returning into the abdomen with a murmuring noiſe.

This kind of rupture may be ſuſtained with but little inconveniences by men not much addicted to hard labour, and women with child; but it ſhould never be left to itſelf without a ſupport or truſs, leſt, by ſome accident, the inteſtines ſhould become incarcerated, and incapable of being returned. When the diſorder is recent, and in a young ſubject, it may be perfectly cured without danger of a relapſe; as it may alſo in adults and old people, by conſtantly wearing a proper truſs. It is leſs dangerous when the inteſtine is attended with the omentum. When the inteſtine is returnable, the ſurgeon ſhould immediately reduce the parts, and retain them in their proper ſituation, and to cloſe up the aperture firmly with a truſs, bandage, or by inciſion, termed celotomy.

Another method conſiſts chiefly in paſſing a ſmall gold wire round the upper part of the proceſs of the peritonæum, near the ring of the abdominal muſcles, leaving the teſticle in its natural poſition: the wire is twiſted by a pair of forceps, ſo as to confine the proceſs of the peritonæum without compreſſing the ſpermatic veſſels, in order to prevent the inteſtine from falling through it again: this method, however, is not thought effectual in moſt caſes by Heiſter.

In order to preſerve the teſticle, ſome ſurgeons do not tie the proceſs of the peritonæum and ſpermatic veſſels with a ligature, but having returned the inteſtines and omentum, they then ſcarify the ring of the abdomen, through which the inteſtine prolapſed, together with the ſkin, in order to render the cicatrix more firm.

If in the enterocele the inteſtine cannot be reduced, eſpecially if it adhere to the proceſs of the peritonæum, ring of the abdominal muſcles, ſcrotum, or teſticle, no truſs or bandage will be of any ſervice: there is, then, but one method of ſaving the patient, by a ſevere operation; in order to which the integuments are to be divided; and when the ſacculus appears, it is to be ſeparated, and a ſmall aperture made in it big enough to introduce a quill, or ſome other inſtrument to ſeparate the inteſtine from all its adheſions, before it is protruded into the abdomen, which ſhould always be done when the inteſtine adheres; after which the wound is to be healed, and the patient ſecured from a relapſe, by wearing the bandage, ſpica. See BANDAGE and TRUSS.

If the ſtricture of the inteſtine is ſo great as to render all means ineffectual to reduce the rupture, the ſurgeon muſt then have recourſe to the knife to ſave the patient.

ENTERO-EPIPLOCELE, a ſpecies of rupture, wherein the omentum, together with the inteſtines, fall into the ſcrotum. See the preceding article.

ENTEROLOGY, a term uſed by phyſicians, for a diſcourſe or treatiſe on the contents of the head, breaſt, and abdomen. See the articles HEAD, *&c.*

ENTEROMPHALUS, the ſame with a hernia umbilicalis, or rupture at the navel. See the article EXOMPHALUS.

ENTERPLEADER, in law, ſignifies the diſcuſſing or trial of a point, incidentally falling out, before the principal cauſe can be determined.

It is allowed that a defendant cannot be twice charged with the ſame thing, or to two ſeverally, where no default is in him; thus if one man brings detinue againſt the defendant upon bailment of goods, and another a trover againſt the ſame perſon; in this caſe there ſhall be an enterpleader, to aſcertain which of the parties has a right to his action.

Judgment may be given on an enterpleader, to recover what is demanded againſt the defendant; and where two have enterpleaded, the perſon recovering ſhall have damages of the other.

ENTERSOLE, in architecture, a kind of little ſtory, ſometimes called a mezanzine, contrived occaſionally at the top of the firſt ſtory, for the convenience of a wardrobe, *&c.*

ENTERTAINMENT, in a theatrical ſenſe. See the article FARCE.

ENTHUSIASM, ενθȣσιασμος, a tranſport of the mind, whereby it is led to think and imagine things in a ſublime, ſurpriſing, yet probable manner. This is the enthuſiaſm felt in poetry, oratory, muſic, painting, ſculpture, *&c.*

ENTHUSIASM, in a religious ſenſe, implies a tranſport of the mind, whereby it fancies itſelf inſpired with ſome revelation, impulſe, *&c.* from heaven. Mr. Locke gives the following deſcription of enthuſiaſm. “In all ages, men in whom melancholy has mixed with devotion, or whoſe conceit of themſelves has raiſed them into an opinion of a great familiarity with God, and a nearer admittance to his favour than is afforded to others, have often flattered themſelves with a perſuaſion of an immediate intercourſe with the deity, and frequent communications from the divine ſpirit. Their minds being thus prepared, whatever groundleſs opinion comes to ſettle itſelf ſtrongly upon their fancies, is an illumination from the ſpirit of God, and preſently of divine authority. And whatſoever odd action they find in themſelves a ſtrong inclination to do, that impulſe is concluded to be a call or direction from heaven, and muſt be obeyed. It is a commiſſion from above, and they cannot err in executing it. This I take to be properly enthuſiaſm, which though ariſing from the conceit of a warm and overweaning brain, works when it once gets footing more powerfully on the perſuaſions and actions of men, than either reaſon or revelation, or both together. Men being moſt forwardly obedient to the impulſes they receive from themſelves.” Devotion, when it does not lie under the check of reaſon, is apt to degenerate into enthuſiaſm. When the mind finds itſelf inflamed with devotion, it is apt to think that it is not of its own kindling, but blown up with ſomething divine within it. If the mind indulges this thought too far, and humours the growing paſſion, it, at leaſt, flings itſelf into imaginary raptures and ecſtacies; and when once it fancies itſelf under the influence of a divine impulſe, no wonder if it ſlights human ordinances, and refuſes to comply with the eſtabliſhed form of religion, as thinking itſelf directed by a much ſuperior guide.

ENTHUSIAST, a perſon poſſeſſed with enthuſiaſm. See the preceding article.

ENTHYMEME, ενθυμημα, among logicians, denotes a ſyllogiſm, perfect in the mind, but imperfect in the expreſſion, by reaſon one of the propoſitions is ſuppreſſed, as being eaſily ſupplied by the underſtanding of thoſe with whom we diſcourſe. e. g. *In every right-lined triangle, the three angles are juſt equal to two right ones*; *therefore, thoſe of an iſoſcles are ſo*: where the propoſition, *every iſoſcles is a right-lined triangle*, is omitted, as being ſufficiently known. But to give a more familiar example; ſuppoſe the enthymeme to be, *every man is mortal*; *therefore every king is mortal*: where the minor propoſition, *every king is a man*, is omitted for the reaſon already mentioned. There is a particular elegance in the enthymeme form of arguing, as leaving ſomewhat to the exerciſe and invention of the mind; for which reaſon it is very frequent, as well in common converſation, as in the moſt polite writers. It not only ſhortens diſcourſe, and adds a certain force and livelineſs to our reaſoning, but gives the reader a pleaſure not unlike that the author himſelf feels in compoſing. By this means we are put upon exerting ourſelves, and ſeem to ſhare in the diſcovery of what is propoſed to us.

ENTIER, in the manege, a reſty horſe that not only refuſes to turn, but reſiſts the hand: provided he flies or parts from the heels, you have a remedy for him, by uſing a caveſſon made after the duke of Newcaſtle's way.

ENTIERTY, or ENTIERTIE, among lawyers, ſignifies the whole of a thing, in contradiſtinction to a moiety; thus a bond, damages, &c. are ſaid to be entire, when they cannot be apportioned.

ENTIRE TENANCY, in law, is when the ſole poſſeſſion is in one perſon; in contradiſtinction to ſeveral tenancy, which is a joint or common poſſeſſion in two or more.

ENTITIVELY and ENTITY, among metaphyſicians. See the article ENS.

ENTOYER, in heraldry, denotes a bordure charged wholly with things without life: it ſeems to be a corruption of the french *entour*, round about.

ENTRAILS, the ſame with inteſtines. See the article INTESTINES.

ENTRANCE *of hounds*, among ſportſmen, denotes the inſtructing them how to hunt: for which purpoſe, it is proper to lead them through warrens and flocks of ſheep, to enure them to be under command, and to run at nothing without the huntſman's orders; and when the game appears, the young hounds are to be entered along with the beſt and ſtauncheſt hounds that can be got, and not one barking dog ſuffered to be near. The hare is the beſt game on ſuch an occaſion, becauſe, in this chaſe, the young hounds will learn all the doublings they can poſſibly meet with in any other kind. When the hare is killed, they muſt not be allowed to break her up; but the huntſman is to ſkin and cut her in pieces, with which the young hounds are to be rewarded.

ENTRE MINHO DOURO, a province of Portugal, having the river Minho on the north, Douro on the ſouth, and the Atlantic ocean on the weſt.

ENTRE TAYO and GUADIANA, a province of Portugal, having that of Eſtremadura on the north, and the Atlantic ocean on the weſt.

ENTREPAS, in the manege, a broken pace or going that is neither walk nor trot, but has ſomewhat of an amble.

This is the pace or gait of ſuch horſes as have no reins or back, and go upon their ſhoulders; or, of ſuch as are ſpoiled in their limbs.

ENTRING *a ſhip*, the ſame with boarding. See the article BOARDING.

ENTRING-LADDERS, in a ſhip, are of two ſorts; one uſed by the veſſel's ſides, in a harbour, or in fair weather, for perſons to go in and out of the ſhip: the other is made of ropes, with ſmall ſtaves for ſteps; and is hung out of the gallery to enter into the boat, or to come aboard the ſhip, when the ſea runs ſo high that they dare not bring the boat to the ſhip's ſide for fear of ſtaving it.

ENTRING-ROPES. See the article ROPE.

ENTROCHUS, in natural hiſtory, a genus of extraneous foſſils, uſually of about an inch in length, and made up of a number of round joints, which when ſeparate and looſe, are called trochitæ: they are compoſed of the ſame kind of plated ſpar with the foſſile ſhells of the echini, which is uſually of a bluiſh-grey colour, and are very bright where freſh broken; they are all ſtriated from the center to the circumference, and have a cavity in the middle. See plate XCIII. fig. 3.

The entrochi are found of all ſizes, from that of a pin's head to a finger's length, and the thickneſs of one's middle finger; and are plainly of marine origin, having often ſea-ſhells adhering to them. They ſeem to be the petrified arms of that ſingular ſpecies of the ſea-ſtarfiſh, called ſtella arboreſcens.

They are eſteemed very powerful diuretics, and preſcribed in nephritic caſes with good ſucceſs; the doſe being as much of the powder, as will lie on a ſhilling.

ENTRUSION, or INTRUSION, in law. See the article INTRUSION.

ENTRY, in law, ſignifies taking poſſeſſion of lands or tenements, where a perſon has a right ſo to do.

It is alſo uſed for a writ of poſſeſſion, which is of divers kinds, as, 1. A writ of *entry ſur diſſeiſin*, which lies for the diſſeiſee againſt the diſſeiſor. 2. A writ of *entry ſur diſſeiſin in le per*, that lies for the heir by deſcent, who ſucceeding in right of his anceſtor, is ſaid to be in the *per* or *pere*. 3. A writ of *entry ſur diſſeiſin in le per & cui*, which lies where the feoffee of the diſſeiſor makes a feoffment to another. 4. A writ of *entry ſur diſſeiſin in le poſt*, which lies where after a diſſeiſin the land is removed from one hand to another beyond the degrees, that a writ of entry can be made in the uſual form.

The writ of entry is put out of the degrees by five things. 1. Intruſion, as when the diſſeiſor dies ſeiſed, and a ſtranger enters. 2. Succeſſion, when the ſucceſſor in office or profeſſion enters. 3.

Diſſeiſin upon diſſeiſin, when the diſſeiſor is diſſeiſed by another. 4. Judgment, where a perſon recovers againſt the diſſeiſor. 5. Eſcheat, which is when the diſſeiſor dies without heir, or commits felony, *&c.* on which account the lord enters. In all which caſes, a diſſeiſee, or his heir, ſhall not have a writ of entry within the degrees of the *per*, but in the *poſt*.

There are ſeveral other writs of entry, which lie for the perſon in reverſion, where a tenant for life, for term of years, or by courteſy, aliens, and afterwards dies: and ſo in other caſes.

Forcible **Entry.** See Forcible.

Entry, among ſportſmen, denotes the places or thickets through which deer are found lately to have paſſed.

Bill of **Entry**, in commerce. See Bill.

In making entries inwards, it is uſual for merchants to include all the goods they have on board the ſame ſhip in one bill, though ſometimes they may happen to be upwards of twenty ſeveral kinds; and in caſe the goods are ſhort entered, additional or poſt entries are now allowed; though formerly the goods, ſo entered, were forfeited. As to bills of entry outwards, or including goods to be exported, upon delivering them, and paying the cuſtoms, you will receive a ſmall piece of parchment called a cocket, which teſtifies your payment thereof, and all duties for ſuch goods. See the article Exportation.

If ſeveral ſorts of goods are exported at once, of which ſome are free, and others pay cuſtoms, the exporter muſt have two cockets, and therefore muſt make two entries; one for the goods that pay, and the other for the goods that do not pay cuſtom.

Entries of goods, on which a drawback is allowed, muſt likewiſe contain the name of the ſhip in which the goods were imported, the importer's name, and time of entry inwards. The entry being thus made, and an oath taken that the cuſtoms for thoſe goods were paid as the law directs, you muſt carry it to the collector and comptroller, or their deputies; who, after examining their books, will grant a warrant, which muſt be given to the ſurveyor, ſearcher, or land-waiter, for them to certify the quantity of goods; after which the certificate muſt be brought back to the collector and comptroller, or their deputies, and oath made, that the ſaid goods are really ſhipped, and not landed again in any part of Great Britain. See the articles Drawback and Debenture.

ENVELOPE, in fortification, a work of earth, ſometimes in form of a ſimple parapet, and at others, like a ſmall rampart with a parapet: it is raiſed ſometimes on the ditch, and ſometimes beyond it.

Envelopes are often made to incloſe a weak ground, where that is practicable, with ſingle lines, to ſave the great charge of horn-works and tenails, or where there is not room for ſuch large works. Some give the names of ſillon, counter-guard, conſerve, and lunette, to envelopes raiſed in the moat.

ENVIRONNE', in heraldry, ſignifies ſurrounded with other things: thus, they ſay, a lion environné with ſo many bezants. See the article Bezant.

ENUMERATION, an account of ſeveral things, in which mention is made of every particular article.

Enumeration, in rhetoric, a part of peroration, in which the orator, collecting the ſcattered heads of what has been delivered throughout the whole, makes a brief and artful relation, or recapitulation thereof.

Enumeration *of the parts*, in rhetoric, is much the ſame with diſtribution. See the article Distribution.

ENUNCIATION, a declaration of a thing either in terms of affirmation or denial.

Enunciation, among logicians, the ſame with propoſition. See the article Proposition.

ENVOICE, the ſame with invoice. See the article Invoice.

ENVOY, a perſon deputed to negociate ſome affair with any foreign prince or ſtate.

Thoſe ſent from the courts of France, Britain, Spain, *&c.* to any petty prince or ſtate, ſuch as the princes of Germany, the republics of Venice, Genoa, *&c.* go in quality of envoys, not embaſſadors; and ſuch a character only do thoſe perſons bear, who go from any of the principal courts of Europe to another, when the affair they go upon is not very ſolemn or important. There are envoys ordinary and extraordinary, as well as embaſſadors; they are equally the ſame under the protection of the law of nations, and enjoy all the privileges of embaſſadors, only differing from them in this, that the ſame ceremonies are not performed to them.

ENURE, in law, ſignifies to take effect, or avail: thus, they ſay, a releaſe made to a tenant for life, ſhall enure, and be of force to the perſon in reverſion.

ENURNY, in heraldry, is applied to a bordure charged with beaſts.

ENVY, in ethics, is defined to be an uneaſineſs of the mind, cauſed by the conſideration of a good we deſire, obtained by one we think leſs worthy of it than ourſelves.

EON, among anatomiſts, is ſometimes uſed for the whole ambit of the eye.

EON, or ÆON, in church-hiſtory. See the article ÆON.

EPACT, in chronology, a number ariſing from the exceſs of the common ſolar year above the lunar, whereby the age of the moon may be found out every year. See the articles YEAR and MOON.

The exceſs of the ſolar year above the lunar is 11 days; or the epact of any year expreſſes the number of days from the laſt new moon of the old year, which was the beginning of the preſent lunar year, to the firſt of January. The firſt year of the cycle of the moon, the epact is 0, becauſe the lunar year begins with the ſolar. On the ſecond, the lunar year has begun 11 days before the ſolar year, therefore the epact is 11. On the third, it has begun twice 11 before the ſolar year, therefore the epact is 22. On the fourth, it begins three times 11 days ſooner than the ſolar year, the epact would therefore be 33; but 30 days being a ſynodical month, muſt that year be intercalated; or that year muſt be reckoned to conſiſts of thirteen ſynodical months, and there remains three, which is the true epact of the year; and ſo on to the end of the cycle, adding 11 to the epact of the laſt year, and always rejecting 30, gives the epact of the preſent year. Thus to adjuſt the lunar year to the ſolar, through the whole of 19 years, 12 of them muſt conſiſt of 12 ſynodical months each, and 7 of 13, by adding a month of 30 days to every year when the epact would exceed 30, and a month of 29 days to the laſt year of the cycle, which makes in all 209 days, *i. e.* 19 × 11; ſo that the intercalary or embolimæan years in this cycle are 4, 7, 10, 12, 15, 18, 19. See the article CYCLE.

If the new moons returned exactly at the ſame time after the expiration of nineteen years, as the council of Nice ſuppoſed they would do (when they fixed the rule for the obſervation of eaſter, and marked the new moons in the calendar for each year of the lunar cycle) then the golden number multiplyed by 11, would always give the epact. But in a julian century, the new moons anticipate, or happen earlier than that council imagined they would, by $\frac{8}{25}$ of a day. In a gregorian common century, which is one day ſhorter than a julian century, they happen $\frac{17}{25}$ of a day later, (1 day $-\frac{8}{25}=\frac{17}{25}$). Now $\frac{17}{25}\times 3=\frac{51}{25}$ for the three common centuries, but $\frac{8}{25}$ being ſubtracted, on account of the gregorian biſſextile century, there will remain $\frac{43}{25}$. Therefore in four gregorian centuries, the new moons will happen later by $\frac{43}{25}$ of a day, and the epacts muſt be decreaſed accordingly.

At preſent the gregorian epact is 11 days ſhort of the julian epact; but the quotient of the number of the centuries divided by 4, which at this time is 4, multiplied by $\frac{43}{25}$, with the addition of the remainder 1 multiplied by $\frac{17}{25}$, makes in all but $\frac{189}{25}$, or 7 days $+\frac{14}{25}$, therefore $\frac{86}{25}$, *i. e.* 3 days $+\frac{11}{25}$ muſt be added to complete the 11 days. Whence we have the following

General rule for finding the gregorian EPACT *for ever.* Divide the centuries of any year of the chriſtian æra by 4, (rejecting the ſubſequent numbers;) multiply the remainder by 17, and to this product add the quotient multiplyed by 43; divide the product + 86 by 25; multiply the golden number by 11, from which ſubtract the laſt quotient; and rejecting the thirties, the remainder will be the epact.

Example for 1754.

17 ÷ 4 = 4 remains 1
1 × 17 = 17
43 × 4 + 86 + 17 = 275
275 ÷ 25 = 11
11 × 7 (G. N°.) = 77
77 − 11 = 66
66 − 60 (2 × 30) = 6 = Epact.

A ſhorter rule for finding the epact until the year 1900. Subtract 1 from the golden number, and multiplying the remainder by 11, reject the thirties, and you have the epact.

Example for the year 1754.

$$\begin{array}{lr} & G.N. = 7 \\ G.N.\ 7 - 1 \times 11 = 66 & 1 \\ \hline 66\text{—twice } 30 = 6 = \text{Epact.} & 6 \\ & 11 \\ \hline & 30)66(2 \\ & 6 = \text{Ep.} \end{array}$$

A table of golden numbers, and their correſponding epacts, till the year 1900.

G. N°.	Epact.	G. N°.	Epact.	G. N°.	Epact.	G. N°.	Epact.
1	0	6	25	11	20	16	15
2	11	7	6	12	1	17	26
3	22	8	17	13	12	18	7
4	3	9	28	14	23	19	18
5	14	10	9	15	4		

EPANORTHOSIS, in rhetoric, a figure by which a perſon corrects, or ingeniouſly revokes what he juſt before alledged, as being too weakly expreſſed, in order to add ſomething ſtronger, and more conformable to the paſſion with which he is agitated.

The epanorthoſis is diſtinguiſhed into two kinds, the one is when we correct or revoke the word, as in the following example of the apoſtle, *but I laboured more abundantly than they all: yet not I, but the grace of God, which was with me.* 1 Cor. xv. 10. where what he firſt attributed to his own merit, he chuſes afterwards to call the work of grace, as being the principal cauſe. The ſecond kind of epanorthoſis, is when we correct or revoke the ſentiment, as in the following of Cicero: *Italiam ornare, quam domum ſuam, maluit: quamquam, Italia ornata, domus ipſa mihi videtur ornatior.*

EPARER, in the manege, ſignifies the flinging of a horſe, or his yerking and ſtriking with his hind legs. See the article YERKING.

In caprioles, a horſe muſt yerk out behind with all his force; but in ballotades, he ſtrikes but half out; and, in croupades, he does not ſtrike out his hind legs at all. All ſuch yerking horſes are reckoned rude. See the articles CAPRIOLES, BALLOTADE, *&c.*

EPAULE, in fortification, denotes the ſhoulder of a baſtion, or the place where its face and flank meet, and form the angle called the angle of the ſhoulder. See the article BASTION.

EPAULEMENT, in fortification, a work raiſed to cover ſidewiſe, is either of earth, gabions, or faſcines, loaded with earth. The epaulements of the places of arms for the cavalry, at the entrance of the trenches, are generally of faſcines mixed with earth.

EPAULEMENT alſo denotes a maſs of earth, called likewiſe a ſquare orillon from its figure, raiſed to cover the cannon of a caſemate, and faced with a wall.

It is likewiſe uſed for any work, thrown up to defend the flank of a poſt, or other place.

EPENTHESIS, in grammar, the interpoſition or inſertion of a letter or ſyllable in the middle of a word, as *alituum*, for *alitum*; *relligio*, for *religio*; *induperator*, for *imperator*, &c.

EPERLANUS, in ichthyology, the name uſed by authors for the oſmerus, with ſeventeen rays in the fin beſide the anus, and called in engliſh the ſmelt. See the article OSMERUS.

EPERON, the SPUR-SHELL, in natural-hiſtory. See the article SPUR SHELL.

EPHA, or EPHAH, in jewiſh antiquity, a meaſure for things dry, containing 1. 0961 of a buſhel. See MEASURE.

EPHEDRA, the SEA-GRAPE, or SHRUB HORSE-TAIL, in botany, a genus of the dioecia-syngeneſia claſs of plants, which has no corolla or flower-petals: the ſtamina are ſeven filaments, coaleſcing into a ſubulated column; the antheræ are roundiſh, three being ſuperior, and the other four inferior: the ſeeds are acutely oval, convex on one ſide, and plain on the other, and contained in a baccated cup.

The fruit is red, ſucculent, and of an acid auſtere taſte: its juice, taken in wine, is ſaid to be good for the coeliac paſſion and fluor albus.

EPHEMERA, in medicine, the name of a ſpecies of fever continuing the ſpace of one day, or ſometimes more; for the medical writers expreſs themſelves by *ephemera ſimplex, vel plurium dierum.* See the article FEVER.

This ſpecies of fever has this peculiar to it, that the pulſe is at firſt large, but as it becomes afterwards moderately quick and frequent, ſo it is equal, ſoft, and regular, as in a natural ſtate. The urine undergoes little or no change, nor is the diſorder preceded by a loathing of food, a ſpontaneous laſſitude of the body, diſturbed ſleep, preternatural yawning, or horror; but it ſeizes the patient ſuddenly, and afflicts him with no other ſymptoms than a pain of the head and ſtomach, a nauſea, heat and reſtleſneſs. The perſons moſt ſubject to this fever, are young men who have much blood, and feed heartily, and ſuch as have had any habitual diſcharge of blood ſtopped upon them, whether natural, as in the hæmorrhoidal or menſtrual diſcharges, or artificial, ſuch as frequent bleeding, cupping, and the like. And thoſe who have thrown their blood into violent emotions by the too free uſe of ſpirituous liquors, too violent exerciſe, unuſual watchings, long ſtay by large fires, a ſudden repreſſion of ſweats by cold water, or by violent paſſions, particularly anger. In the treatment of this fever, the proper courſe is to attemperate the violent motions of the blood with nitrous and the fixed antimonial medicines, and occaſionally with gentle acids. Sweat is to be promoted. Nitre, crabs-eyes, *&c.* may be preſcribed in ſmall doſes every three or four hours; and towards night, ſudorifics ſhould be joined to theſe, ſuch as the contrayerva-root, or the like. The ephemera, properly ſo called, differs in nothing except the time of its duration, from that which commonly laſts four days.

EPHEMERA MALIGNA, is alſo a term by which ſome authors have called the ſudor anglicanus, or malignant diary fever, which generally deſtroyed the patient in twenty-four hours. See the article SUDOR ANGLICANUS.

EPHEMERA, the DAY-FLY, in zoology, a genus of flies belonging to the neuroptera order, and ſo called from their living only one day and a night: they are about the ſize of the leſſer houſe-flies, and have two gibbous protuberances on the top of the head, reſembling eyes: add to this, that the tail is furniſhed with hairs, and the antennæ are ſhort.

Of this genus there are ſeveral ſpecies, diſtinguiſhed by their different colours, and the number of hairs in their tail; ſome having two, and others three.

EPHEMERIDES, in literary hiſtory, an appellation given to thoſe books or journals, which ſhew the motions and places of the planets for every day in the year.

It is from the tables contained in theſe ephemerides, that eclipſes, and all the variety of aſpects of the planets, are found. See the articles ECLIPSE, CONJUNCTION, OPPOSITION, *&c.*

EPHESUS, an antient city of Ionia in the leſſer Aſia, ſituated, eaſt long. 27° 40′, north lat. 37° 5′, near the ſea, on the mouth of the river Cauſtrus, which formed a commodious harbour. It was the capital of Aſia during the roman government; and here ſtood the ſo much celebrated temple of Diana.

EPHIALTES, εφιαλτης, in medicine, the ſame with the incubus, or night-mare. See the article INCUBUS.

EPHIPPIUM, in anatomy, the ſame with the cella turcica, being a part of the os ſphenoides. See the article SPHENOIDES.

EPHOD, in jewiſh antiquity, one part of the prieſtly habit; being a kind of girdle which, brought from behind the neck over the two ſhoulders, and hanging down before, was put croſs the ſtomach, then carried round the waiſte, and made uſe of as a girdle to the tunic.

There were two ſorts of ephods, one of plain linen for the prieſts, and the other embroidered for the high prieſt. Of this laſt Moſes gives an ample deſcription. It was compoſed of gold, blue, purple, crimſon and twiſted cotton. Upon part of it, which paſſed over the ſhoulders, were two large precious ſtones, one on each ſhoulder: upon theſe were engraven the names of the twelve tribes, ſix upon each ſtone.

The ephod was peculiar to the prieſthood, and thought eſſential to their character; it being the opinion of the Jews, that no worſhip, true or falſe, could ſubſiſt without a prieſthood and ephod.

EPHORI, εφοροι, in grecian antiquity, magiſtrates eſtabliſhed in antient Sparta to balance the regal power. The authority of the ephori was very great. They ſometimes expelled and even put to death the kings, and aboliſhed or ſuſpended the power of the other magiſtrates, calling them to account at pleaſure. There were five of them, others ſay nine. They preſided in the public ſhews and feſtivals. They were entruſted with the public treaſure, made war and peace, and were ſo abſolute, that Ariſtotle makes their government equal to the prerogative of a monarchy. They were eſtabliſhed by Lycurgus.

EPIBATERION, επιβατηριον, in antient poetry, a poem rehearſed at a perſon's return from a voyage, thanking the immortal gods for his preſervation.

EPIC, or HEROIC POEM, a poem expreſſed in narration, formed upon a ſtory partly real, and partly feigned; repreſenting, in a ſublime ſtile, ſome ſignal and fortunate action, diſtinguiſhed by a variety of great events, to form the morals, and affect the mind with the love of heroic virtue. See the article POEM.

We may diſtinguiſh three parts of the definition, namely, the matter, the form, and the end. The matter includes the action of the fable, under which are ranged ed the incidents, epiſodes, characters, morals, and machinery. The form comprehends the way or manner of the narration, whether by the poet himſelf, or by any perſons introduced, whoſe diſcourſes are related: to this branch likewiſe belong the moving of the paſſions, the deſcriptions, diſcourſes, ſentiments, thoughts, ſtile, and verſification; and beſides theſe, the ſimilies, tropes, figures, and, in ſhort, all the ornaments and decorations of the poem. The end is to improve our morals, and increaſe our virtue. See the articles ACTION, FABLE, EPISODE, CHARACTER, *&c.*

There are two things which chiefly diſtinguiſh epic from tragedy, the manner of the repreſentation, and the event or cataſtrophe. As to the former it is certain that tragedy is formed upon action, and epic upon narration. This is the principal character in an heroic poem, and a very difficult part of it. The qualities a narration muſt have to be perfect, are theſe: it muſt be ſhort and ſuccinct, that nothing may be idle, flat, or tedious: it muſt be lively, quick, and delightful; it muſt be ſimple and natural. The moſt ordinary graces of a narration, muſt come from the figures, the tranſitions, and from all thoſe delicate turns that carry the reader from one thing to another, without his regarding it. It muſt never point out all the matter, that ſome may be left for the natural reflections of the reader. It muſt likewiſe avoid the particulars and length of affected deſcriptions. Laſtly, the narration muſt be delightful, not only by the variety of things it relates, but by the variety of its numbers. It is this variety that makes the greek verſification more harmonious and more proper for narration than the Latin.

Epic alſo differs from tragedy in the event, or concluſion. In tragedy, the concluſion is generally unfortunate, but never ſo in epic: the reaſons of which rule are the examples of Homer and Virgil, who are, and ought to be, our guides and patterns in this particular, and in which they have been univerſally followed by all who would have been thought epic writers; and not only their authority, but the very reaſon of the thing ſupplies us with arguments for this rule. 1. Although in tragedy, where the action is much ſhorter, more ſimple, and finiſhed, as it were, at a heat, an unfortunate concluſion may be ſo far from diſpleaſing, that it may be more agreeable to the audience: yet in epic, after ſuch a ſeries and variety of adventures, after ſuſtaining ſo many and ſuch great difficulties, the reader muſt be out of humour with the poet, unleſs the whole ſhould conclude happy at laſt. 2. The chief end of tragedy is to excite the paſſions, eſpecially thoſe of terror and pity, by a ſhort and briſk emotion; but the deſign of an epic poem is, by more ſlow and leiſure operations, to remove bad habits, and reſtore good ones; to ſubdue vice and recommend virtue, which would be done with a very ill grace, if the hero of the poem ſhould come to a deplorable end. 3. An epic poem, properly ſo called, is, and ſhould be, written in honour of the country and religion of the author, between which and the hero there is a near relation; and therefore he ought to come off in triumph at laſt. Theſe two differences are, as the ſchools call them, ſpecific differences, being ſo in nature: the others are only accidental, being differences in degree, extent, and greatneſs. Although epic poetry is directed to the morals and the habit rather than the paſſions, yet it likewiſe has paſſions, but in an inferior degree to tragedy: for though it has a mixture of all the paſſions, yet joy and admiration are the moſt eſſential to it.

An epic poem muſt be formed upon a ſtory partly real and partly fictitious. In tragedy, which is much ſhorter, the performance may not only be excuſable, but commendable, though the whole fable ſhould be fictitious; but in ſuch a long work as that of an epic poem, the reader will be tired unleſs he has the pleaſure of finding ſome truth interwoven with the fable.

The moderns ſeem to miſtake that part of the epic and tragedy which contain the wonderful, confounding it with improbable, and uſing the two words promiſcuouſly. If it was really ſo, the wonderful would be always faulty; for that is always ſo which is improbable. The great art is a juſt temperament and mixture of both, to make it natural and probable. Scarce any of the poets but Virgil had the art, by the preparation of incidents, to manage the probability in all the circumſtances of an epic poem. Homer is not altogether ſo ſcrupulous and regular in his contrivances: his machines are leſs juſt, and all his meaſures, to ſave the probability, are leſs exact. Laſtly, the ſovereign perfection of an epic poem, in the opinion of Ariſtotle, conſiſts in the juſt proportion and perfect connection of all the parts. It is not ſufficient that all be grand and magnificent in an epic poem, but all muſt be juſt, uniform, and proportionable, in the different parts that compoſe it.

This is all that can be obſerved moſt eſſential to an epic poem: little need be ſaid about the machinery, which, among the antient heathens, was the agency of their falſe gods, and of angels and dæmons among us chriſtians: its beauty and magnificence are well known. The dignity of an epic poem would ſcarce be kept up without it, eſpecially ſince the marvellous depends on it. The verſification of epic poetry, among the Greeks and Romans, conſiſted of hexameters, a ſort of verſe ſo peculiar to epic, that when it is uſed upon other occaſions, it is called heroic verſe. Our engliſh verſe comes neareſt to it both in gravity and majeſty, but at how great a diſtance! See the article HEXAMETER.

An epic or heroic poem, is the beſt and moſt perfect kind of poetry; it is the greateſt work which the ſoul of man is capable of performing; and here it is the utmoſt bounds are ſet to human compoſition. All the nobleneſs and the elevation of the moſt perfect genius, can hardly ſuffice to form ſuch a one as is requiſite for an heroic poet: the difficulty of finding together fancy and judgment, heat and imagination, and ſobriety of reaſon, precipitation of ſpirit, and ſolidity of mind, renders this character ſo very rare: it requires great images, and yet a greater wit to form them. There muſt be a judgment ſo ſolid, a diſcernment ſo exquiſite, ſuch perfect knowledge of the language in which he writes, ſuch obſtinate ſtudy, profound meditations, and vaſt capacity, that ſcarce whole ages can produce one genius fit for an epic poet: even among the antients themſelves, if we except Homer and Virgil, we ſhall ſcarce find one that is truly an epic poet.

EPICARPIUM, in antient pharmacy, denotes a remedy applied in form of a plaſter to the wriſts, for intermitting fevers: it conſiſted of penetrating ingredients, as garlic, onion, camphor, &c.

EPICEDIUM, επικηδιον, in antient poetry, a poem rehearſed during the funeral ſolemnity of perſons of diſtinction. See the article NENIA.

We find two beautiful epicediums in Virgil, one of Euryalus, and the other of Pallas.

EPICERASTICS, in pharmacy, denote much the ſame with emollients. See the article EMOLLIENTS.

Epiceraſtic medicines obtund the acrimony of the humours, and mitigate the uneaſy ſenſation thence ariſing.

To this claſs belong, 1. The emollient roots, as marſhmallow, liquorice, &c. 2. The leaves of mallows, water-lilly, the large houſe-leek, purſlain and lettuce. 3. The ſeeds of barley decorticated, henbane, lettuce, flax, white poppy, and rue. 4. Fruits, as jubebs, raiſins, ſweet apples, prunes, and ſweet almonds. 5. Cooling juices, whites of eggs, whey, oils, ſyrup, and ſugar of violets, &c.

EPICHIREMA, επιχειρημα, in logic, a mode of reaſoning, which comprehends the proof of one or both the premiſes of a ſyllogiſm, before the concluſion is drawn.

EPICOENE, in grammar, a term applied to nouns, which, under the ſame gender and termination, mark indifferently the male and female ſpecies. See GENDER.

Theſe nouns are otherwiſe called *promiſcua*, and comprehend the names of a great number of the wild beaſts, more of the wild fowls, and almoſt all the fiſhes, whereof the difference of ſexes is either difficult to be diſcerned, or is rarely adverted to; ſuch are, in Latin, *elephantus*, *paſſer*, *aquila*, *ſalmo*, which equally ſignify a male or female elephant, ſparrow, eagle, or ſalmon. As often as either of the ſexes, are to be diſtinctly mentioned, it is generally done by prefixing to the word male *(mas)* or female *(femina.)*

EPICUREAN PHILOSOPHY, the doctrine or ſyſtem of philoſophy maintained by Epicurus and his followers.

Epicurus, the Athenian, one of the greateſt philoſophers of his age, was obliged to Democritus for almoſt his whole ſyſtem, notwithſtanding he piqued himſelf upon deriving every thing from his own fund. He wrote a great number of books, which are made to amount to above 300. Though none of them are come down to us, no antient philoſopher's ſyſtem is better known than his, for which we are moſtly indebted to the great Lucretius, Diogenes Laertius, and Tully. His philoſophy conſiſted of three parts, canonical, phyſical, and etherial. The firſt was about the canons, or rules of judging. The cenſure which Tully paſſes upon him for his deſpiſing logic, will hold true only with regard to the logic of the ſtoics, which he could not approve of, as being too full of nicety and quirk. Epicurus was not acquainted with the analytical method of diviſion and argumentation, nor was he ſo curious in modes and formation as the ſtoics. Soundneſs and ſimplicity of ſenſe, aſſiſted with ſome natural reflections, was all his art. His ſearch after truth proceeded only by the ſenſes, to the evidence of which he gave ſo great a certainty, that he conſidered them as an infallible rule of truth, and termed them the firſt natural light of mankind.

In the ſecond part of his philoſophy he laid down atoms, ſpace, and gravity as the firſt principles of all things: he did not deny the exiſtence of a God, but thought it beneath his majeſty to concern himſelf with human affairs: he held him a bleſſed, immortal being, having no affairs of his own to take care of, and above meddling with thoſe of others. See ATOM and ATOMICAL.

As to his ethics, he made the ſupreme good of man to conſiſt in pleaſure, and conſequently ſupreme evil in pain. Nature, itſelf, ſays he, teaches us this truth, and prompts us from our birth to procure whatever gives us pleaſure, and avoid what gives us pain. To this end he propoſes a remedy againſt the ſharpneſs of pain: this was to divert the mind from it, by turning our whole attention upon the pleaſures we have formerly enjoyed: he held that the wiſe man muſt be happy, as long as he is wiſe; that pain, not depriving him of his wiſdom, cannot deprive him of his happineſs.

There is nothing that has a fairer ſhew of honeſty than the moral doctrine of Epicurus. Gaſſendus pretends, that the pleaſure in which this philoſopher has fixed the ſovereign good, was nothing elſe but the higheſt tranquility of mind in conjunction with the moſt perfect health of body: but Tully, Horace, and Plutarch, as well as almoſt all the fathers of the church, give us a very different repreſentation: indeed the nature of this pleaſure, in which the chief happineſs is ſuppoſed to be ſeated, is a grand problem in the morals of Epicurus. Hence there were two kinds of Epicureans, the rigid and the remiſs: the firſt were thoſe who underſtood Epicurus's notion of pleaſure in the beſt ſenſe, and placed all their happineſs in the pure pleaſures of the mind, reſulting from the practice of virtue. The looſe or remiſs Epicureans, taking the words of that philoſopher in a groſs ſenſe, placed all their happineſs in bodily pleaſures, or debauchery. Thus we have the whole myſtery of this celebrated doctrine. It was innocent in expreſſion, but criminal in thought; it had a beautiful outſide, but it was all corruption within. Theſe looſe philoſophers took up a ſeeming auſterity to diſguiſe their ſecret indulgence, and all their ſchemes of morality were but ſo many veils for their immoral behaviour.

EPICYCLE, επικυκλος, in the antient aſtronomy, a little circle whoſe center is in the circumference of a greater circle; or it is a ſmall orb, or ſphere, which being fixed in the deferent of a planet, is carried along with it; and yet, by its own peculiar motion, carries the planet faſtened to it round its proper center.

It was by means of epicycles, that Ptolemy and his followers ſolved the various phænomena of the planets, but more eſpecially their ſtations and retrogradations. See the articles PTOLEMAIC SYSTEM, STATIONARY, and RETROGRADATION. The great circle they called the excentric or deferent, and along its circumference the center of the epicycle was conceived to move; carrying with it the planet fixed in its circumference, which in its motion downwards proceeded according to the order of the ſigns, but, in moving upwards, contrary to that order. The higheſt point of a planet's epicycle they called apogee, and the loweſt perigee. See the articles APOGEE and PERIGEE.

EPICYCLOID, in geometry, a curve generated by the revolution of the periphery of a circle, A C E (plate LXXXVIII. fig. 3) along the convex or concave ſide of the periphery of another circle, D G B.

The length of any part of the curve, that any given point in the revolving circle has deſcribed, from the time it touched the circle it revolved upon, ſhall be to double the verſed ſine of half the arch, which all that time touched the circle at reſt, as the ſum of the diameters of the circles, to the ſemidiameter of the reſting circle, if the revolving circle moves upon the convex ſide of the reſting circle; but if upon the concave ſide, as the difference of the diameters to the ſemidiameter of the reſting circle.

In the Philoſophical Tranſactions, n° 218, we have a general propoſition for meaſuring the areas of all cycloids and epicycloids, *viz.* The area of any cycloid or epicycloid is to the area of the generating circle, as the ſum of double the velocity of the center and velocity of the circular motion to the velocity of the circular motion: and, in the ſame proportion, are the areas of ſegments of thoſe curves to thoſe of analogous ſegments of the generating circle.

EPIDEMIA, επιδημια, in grecian antiquity, feſtivals kept in honour of Apollo and Diana, at the ſtated ſeaſons when theſe deities, who could not be preſent every where, were ſuppoſed to viſit different places, in order to receive the vows of their adorers.

The feſtival took its name epidemia, from επι, among, and δκμος, people; on account of the imaginary preſence of thoſe deities among the people.

Epidemia is alſo uſed for private feaſts, or rejoicings, on account of the ſafe return of a friend from a voyage or journey.

EPIDEMIC, among phyſicians, an epithet of diſeaſes which at certain times are popular; attacking great numbers at or near the ſame time. See the article Disease.

Epidemic diſeaſes differ from thoſe called endemic. See the article Endemic.

Boerhaave obſerves, that though every particular diſeaſe, in various epidemical conſtitutions, appear, to unattentive obſervers, the ſame with regard to their names, ſigns, and conſequences in ſome meaſure; yet to the judicious, they will appear quite otherwiſe, ſo as to require a different adminiſtration of the non-naturals, different treatment, and different medicines. This variety, however, in epidemical diſeaſes, is ſo obſcure, that phyſicians have not yet been able to deduce it from any abuſe of non-naturals: and yet there are many circumſtances which make it highly probable, that the cauſes reſide in the air, but depend more upon the inexplicable variety of exhalations contained therein, which, by their mixture with the fluids of the body, or their ſtimulus, injure the human machine, than upon any change in the ſenſible qualities thereof. See the article Effluvium.

Upon the invaſion of any unknown epidemical diſtemper, the phyſician will receive ſome information with reſpect to the cure: 1. By reducing the diſtemper to ſome more known kind, which it moſt reſembles. 2. By obſerving its tendency at the vernal and autumnal equinoxes; at which ſeaſons it is generally moſt prevalent. 3. By attending to the ſpontaneous phænomena, which precede, accompany, or follow the death or recovery of the patient, and the better or worſe ſtate of the diſorder. 4. By diligently remarking the benefit or injury received, from whatever the patients are unavoidably obliged to do; and from whatſoever is taken into, or diſcharged out of the body. 5. By comparing the caſes of a great many patients, labouring under the diſtemper at the ſame time. 6. By abſtaining from all remedies which are dubious, which irritate and induce a conſiderable change in the humours, and thereby obſcure the nature and tendency of the diſeaſe.

According to Van Swieten, the origin of epidemic fevers, and we may add of other epidemical diſorders, is always from ſome cauſe in common to the whole people who inhabit any particular place: thus, for example, when in beſieged cities the ſcantineſs of the market obliges all to uſe an ill courſe of diet; hence it is, that they have uſually the ſame courſe and ſymptoms, in different patients, and therefore require the ſame method of cure. See Fever, Pox, &c.

EPIDENDRA, in botany, a term uſed by ſome naturaliſts for the paraſitical plants, or thoſe which grow on trees, ſhrubs, and other vegetables: ſuch are miſletoe, dodder, &c. See the articles Misletoe, Dodder, &c.

EPIDENDRUM, vanilla, in botany, a genus of the gynandria diandria claſs of plants, the flower of which conſiſts of five very long and patent petals: the ſtamina are two very ſhort filaments, growing upon the piſtil: the fruit is a very long, rounded, and carnoſe pod, containing a multitude of minute ſeeds.

EPIDERMIS, in anatomy, the ſame with the cuticle. See the article Cuticle.

EPIDIDYMUS, in anatomy, the name by which ſome call each of the two bodies more uſually known by that of paraſtata. See the article Parastatæ.

EPIGÆA, in botany, a genus of the decandria monogynia claſs of plants, the calyx of which is a double permanent perianthium; the corolla conſiſts of a ſingle cup-faſhioned petal; the fruit is a globular, depreſſed, five-cornered capſule, conſiſting of five valves, and containing five cells; the ſeeds are numerous and roundiſh, and the receptacle large, and divided into five parts.

EPIGASTRIC REGION, a part or ſubdiviſion of the abdomen. See the article ABDOMEN.

EPIGASTRIC VESSELS, the arteries and veins belonging to the epigaſtric region; the former being branches of the coeliac artery, and the latter of the iliac veins. See the articles ARTERY and VEIN.

EPIGLOTTIS, in anatomy, one of the cartilages of the larynx, or wind-pipe. It is often of the ſhape of an ivy-leaf, and joined to the thyroide cartilage; over which it appears erect, immediately behind the root of the tongue; to which it is alſo connected by its middle ligament, by two lateral ones to the cornua of the os hyoides, and by two poſterior ones, to the arytænoide cartilage. In the act of ſwallowing, it covers the glottis, or aperture of the larynx, and prevents any thing getting into it. See the articles LARYNX and GLOTTIS.

EPIGRAM, in poetry, a ſhort poem or compoſition in verſe, treating only of one thing, and ending with ſome lively, ingenious, and natural thought or point.

Epigram originally ſignified the ſame as inſcription, it being uſual among the antients to cut inſcriptions upon columns, walls, ſtatues, trophies, ſhields, *&c.* which inſcriptions, when expreſſed in poetical conceits, were afterwards termed epigrams. In proceſs of time, other poems of the like nature went by the name of epigrams, from their affinity with thoſe inſcriptions, and people began to uſe them for the relating of little facts and accidents, the characterizing of perſons, *&c.*

The chief characteriſtics of the epigram are acuteneſs and facetiouſneſs. It ſhould only tend to one point, which is always to be expreſſed with ſtrength and poignancy in the laſt verſe, excepting ſome that are more remarkable for their ſoftneſs and delicacy, or ſome other elegance. But above all things, a redundancy, or ſuperfluity of expreſſion, is to be avoided. Authors are much divided as to the length of an epigram. There are inſtances both among the antients and moderns of very long ones, but ſtill it is allowed, that the ſhorter are the better, as ſeeming moſt natural to this kind of poem. The greek epigrams run upon a turn of thought which is natural, but fine and ſubtile. They have nothing that bite, yet they are not inſipid except a few, which are quite flat and ſpiritleſs. We ſpeak of theſe collected in the anthology. The latin epigram, by a falſe taſte that prevailed in the beginning of the decay of pure latinity, endeavours to ſurprize the reader by a point. Catullus wrote after the greek manner, for he endeavours to cloſe a natural thought with a delicate turn of words, and with the ſimplicity of a very ſoft expreſſion. Martial was in ſome meaſure the author of the other way. Boileau ſays, the fineſſe and ſubtility of the epigram ſhould turn upon the words, rather than the thoughts, by which means he reduces it to the nature of a pun, or equivoque. See the article PUN.

EPIGRAPHE, επιγραφη, among antiquarians, denotes the inſcription of a building, pointing out the time when, the perſons by whom, the uſes, and the like, for which it was erected.

EPILEPSY, επιληψια, in medicine, the ſame with what is otherwiſe called the falling-ſickneſs, from the patient's falling ſuddenly to the ground.

Sometimes this diſeaſe comes upon the patient unawares; but it more frequently gives notice of its approach, by a laſſitude of the whole body, a heavy pain in the head, with ſome diſturbance of the ſenſes, unquiet ſleep, unuſual dread, dimneſs of ſight, and a noiſe in the ears: in ſome there is a violent palpitation of the heart, a puffing or inflation of the breaſt, difficult reſpiration, a murmuring noiſe in the belly, fœtid ſtools, a flux of the urine, and a refrigeration of the joints: in others, there is a ſenſation, as it were, of cold air, aſcending from the extreme parts towards the brain and heart. At length falling ſenſeleſs to the ground, the thumbs are ſhut up cloſe in the palms of the hands, and are with difficulty taken out: the eyes are diſtorted or inverted, ſo as nothing but the whites appear: all ſenſation is ſuſpended, inſomuch that no ſmell, no noiſe, nor even pinching of the body is able to bring them to themſelves: they frothe at the mouth, with a hiſſing kind of noiſe; the tongue is lacerated, or torn by the teeth, and there is a ſhaking or trembling of the joints. However, in different patients, the ſymptoms vary; for ſometimes inſtead of convulſive motions, the limbs are all ſtiff, and the patient is as immoveable as a ſtatue:

in infants, the penis is erected; and, in young men, there is an emiſſion of the ſemen, and the urine ſometimes ſtreams out to a great diſtance. At laſt there is a remiſſion of the ſymptoms, and the patients come to themſelves after a longer or ſhorter interval; then they complain of a pain and heavineſs of the head, and a laſſitude of all their joints.

Theſe fits uſually return on certain days, or age of the moon, but eſpecially about the new or full moon; in women chiefly about the time of menſtruation; and as to the prognoſtics, they generally leave the patient about the time of puberty.

As to the cure, in adults or grown perſons, it is extremely difficult; but, in children, it is juſt the reverſe. Bliſters laid on the back part of the head are of great uſe a little before the fit is expected; which may the more certainly be foreknown, as this diſeaſe is influenced by the moon. The moſt proper medicines to correct the juices ſeem to be native cinnabar, and wild valerian root; a dram of which may be taken morning and evening for three or four months, and afterwards two or three days before the new and full moon. Or, two ſcruples of the powder of wild valerian-root, mixed with one of that of native cinnabar, may be taken morning and evening. Ambergreaſe and muſk are alſo accounted excellent.

It muſt not however be forgot, that this diſeaſe owes its origin to ſo many different cauſes, and is bred in ſo many different conſtitutions of the body, that the ſame remedy which ſucceeds in one caſe, often fails in another; and, therefore, different medicines are to be tried, eſpecially in adults. In caſe of a plethora, bleeding in the ankles will be proper. If the humours be in fault, cathartics, iſſues, cauteries, and bliſters muſt be uſed. If in children, it proceeds from gripes, or the breeding of teeth, nothing is better than to cleanſe the belly by milk clyſters, with a little venice-ſoap diſſolved in them. Some epileptic powder with cinnabar, or extract of rhubarb, and made into an electuary with ſyrup of roſes and manna, may likewiſe be given in proper doſes.

During the fit, too free an uſe of volatiles, ſpirituous liquors, and ſtrong ſmells are hurtful, as cauſing the humours to flow too much to the head. The beſt method is to place the patient in an erect poſture, and to rub the hands and feet pretty briſkly; and the beſt drink is pure water, which will mitigate, if not cure, the ſymptoms.

When the diſeaſe is cauſed by external violence, or extravaſations of humours in the head, cinnabar reduced into an impalpable powder, and given in large doſes with other cephalics and diaphoretics, has a kind of ſpecific virtue.

According to Dr. Cheyne, a milk-diet will cure the moſt inveterate epilepſy. Miſletoe is alſo ſaid to cure it, as ſure as the bark does an intermitting fever: its doſe, to grown people, is half a dram or more, in powder, to be taken every ſixth hour, drinking after it a draught of a ſtrong infuſion of the ſame plant; and if to every ounce of the powder, a dram of aſſa fœtida be added, the medicine will be ſtill more effectual. Cinnabar of antimony is alſo greatly celebrated for the cure of this diſeaſe, and may be taken from four grains to a ſcruple, in conſerve of roſemary-flowers. If the diſeaſe is inveterate, ſome adviſe to give the following pills for a month, *viz.* Take caſtor and gum ammoniac, of each eight grains; wild valerian-root, half a ſcruple; ſalt of tartar, ſeven grains; and as much of tincture of caſtor as is ſufficient to form them into pills, one of which makes a doſe. On every ſeventh day, a cathartic ſhould be given; and ſometimes, inſtead of the caſtor and gum, filings of ſteel may be ſubſtituted.

A decoction of guaiacum, or ſaſſafras, taken twice a day, ſix or eight ounces at a time, and continued for thirty or forty days, is alſo ſaid to cure the epilepſy; eſpecially, if male piony-root, or the like, be added.

The following electuary is alſo recommended as a moſt excellent and certain anti-epileptic: take of peruvian bark, pulveriſed, ſix drams; of virginia ſnake-root, likewiſe pulveriſed, two drams; and of the ſyrup of piony-flowers, as much as is ſufficient to make a ſoft electuary. The doſe, after proper evacuations, in adults, is a dram; which ſhould be taken morning and evening for three or four months; and afterwards only repeated three or four days before the new and full moon.

EPILOBIUM, in botany, the WILLOW-HERB, a genus of the octandria-monogynia claſs of plants, the corolla whereof conſiſts of four roundiſh patent petals, ſomewhat emarginated: the fruit is a very long capſule of a cylindraceous form, ſtriated, made up of four valves, and containing four cells: the ſeeds are numerous, oblong, and crowned with down.

EPILOGUE, in oratory, the end or concluſion of a diſcourſe, ordinarily containing a recapitulation of the principal matters delivered. See PERORATION.

EPILOGUE, in dramatic poetry, a ſpeech addreſſed to the audience after the play is over, by one of the principal actors therein, uſually containing ſome reflections on certain incidents in the play, eſpecially thoſe in the part of the perſon that ſpeaks it.

The epilogue is but of modern date, much later than the prologue: ſeveral have taken the exodium of the Greek drama for an epilogue; but it appears that they are very different; as the exodium was the laſt of the four parts of the tragedy, containing the unravelling the plot, anſwering to the laſt act of modern tragedy.

In the modern tragedy the epilogue has uſually ſomewhat of pleaſantry, intended, in all probability, to compoſe the paſſions raiſed in the courſe of the repreſentation. This is ridiculed by the Spectator, and compared to a merry jigg upon the organ, after a good ſermon, to wipe away any impreſſions that might have been made thereby, and ſend the people away juſt as they came. This practice, however, has the countenance of antiquity, for the Romans had ſomething of the ſame nature, though under a different name; but their exodium was a kind of farce or pantomine, brought on the ſtage when the tragedy was over, to compoſe the minds of the audience.

EPIMEDIUM, BARREN-WORT, in botany, a genus of the tetrandria-monygynia claſs of plants, the flower of which conſiſts of four ovated, obtuſe, concave, patent petals: the fruit is an oblong acuminated pod, compoſed of one cell, but divided by two valves, containing ſeveral oblong ſeeds.

If we may believe Dioſcorides, the leaves of this plant, triturated and drank to the quantity of five drams in wine, for five days together, after the menſtrual purgation, effectually prevent conception.

EPINICION, in the greek and latin poetry, denotes a poem or compoſition on occaſion of a victory obtained. It alſo ſignifies a rejoicing, or feſtival, on account of a victory.

EPIPHANY, a chriſtian feſtival, otherwiſe called the Manifeſtation of Chriſt to the Gentiles, obſerved on the ſixth of January, in honour of the appearance of our Saviour to the three magi, or wiſe men, who came to adore him, and bring him preſents. The feaſt of epiphany was not originally a diſtinct feſtival, but made a part of that of the nativity of Chriſt, which being celebrated twelve days, the firſt and laſt of which were high or chief days of ſolemnity, either of theſe might properly be called epiphany, as that word ſignifies the appearance of Chriſt in the world.

The kings of England and Spain offer gold, frankincenſe, and myrrh, on epiphany, or twelfth day, in memory of the offerings of the wiſe men to the infant Jeſus.

The feſtival of epiphany is called by the Greeks the feaſt of lights, becauſe our Saviour is ſaid to have been baptized on this day; and baptiſm is by them called illumination.

EPIPHONEMA, in rhetoric, a ſententious exclamation containing a lively remark placed at the end of a diſcourſe or narration; ſuch as that of Virgil,

Fas omne abrumpit, Polydorum obtruncat,
& auro
Vi potitur. Quid non mortalia pectora
cogis
Auri ſacra fames?

And that of Lucretius, lib. i.

Tantum relligio potuit ſuadere malorum!

So Milton on the obſtinacy of the rebel angels, who were ſo infatuated, that they would not ſubmit, though they knew almighty power and majeſty came armed againſt them:

"In heav'nly minds can ſuch perverſeneſs dwell?"

This figure cloſes a narration in a very advantageous manner, deeply impreſſes the thing related upon the memory of the reader, and leaves him well pleaſed with the ſenſe and ſagacity of his author. See the article SENTENCE.

EPIPHORA, in medicine, a preternatural defluxion of the eyes, when they continually diſcharge a ſharp ſerous humour, which excoriates the cheeks. The cure is performed by a derivation of the offending humour elſewhere, by bleeding, cupping, bliſters, purges, &c. The acrimony is likewiſe to be corrected by bitter chalybeate wine: ſometimes wine drank alone will perform the cure; after which, aſtringent topics are to be made uſe of.

If an epiphora has been of long ſtanding, it is difficult to be cured, and often degenerates into a fiſtula lachrymalis. See the article FISTULA LACHRYMALIS.

Pitcairn calls an epiphora a ſort of catarrh in the glands of the eye. See the article CATARRH.

EPIPHYLLOSPERMOUS PLANTS, the ſame with the capillary ones. See the article CAPILLARY.

EPIPHYSIS, in anatomy, a bony ſubſtance, or as it were a leſſer bone, affixed to a larger or principal bone, by the intervention of a cartilage. In young ſubjects theſe epiphyſes are not continuous to the principal bone, but are only connected by the intermediate cartilage, and hence they are called appendages to the bones. It is to be obſerved of epiphyſes, 1. That they are all cartilaginous in infants; and though they afterwards grow hard, yet they never arrive at the true denſity of a bone. 2. That moſt of them degenerate into apophyſes in adults. 3. That they do not grow along the plain ſurface of the bone, but unequally, or by a mutual ingreſs with the body of it.

The uſe of the epiphyſes is very different in adults and in infants: in adults they ſeem in the firſt place to ſerve the bones which contain large quantities of marrow, by way of operculum, that this ſoft matter may not run out. 2. They are of ſervice to the articulations, rendering the motions more eaſy, as well as more determinate. 3. They make the whole bone lighter than it would be, if their place were ſupplied by abſolute bony matter. 4. They increaſe the power of the muſcles about the tendons, by means of their prominences. 5. They add to the ſize of the places deſtined for receiving the inſertions of the muſcles. 6. They give a firmer coheſion to the ligaments which ſerve in the articulations, and allow an entrance to the blood-veſſels. The uſes of the epiphyſes in infants are, 1. That by means of their yielding ſoftneſs, they may give way to the compreſſion in the uterus, and ſuffer the whole bulk to be more folded together than otherwiſe it could, ſo that it may lie in a ſmaller compaſs. 2. That they may give way to the elongation and growth of the bones. 3. That they may prevent the frequent fractures, which would otherwiſe unqueſtionably happen to children from their falls, and the other accidents they are liable to.

EPIPLASMA, the ſame with cataplaſm. See the article CATAPLASM.

EPIPLOCELE, in medicine, is a kind of hernia, or rupture, in which the omentum ſubſides into the ſcrotum. The cure conſiſts principally in a reduction of the tumour, by returning the omentum again into the abdomen, and in ſecuring the parts from a relapſe by a truſs or bandage. See HERNIA and ENTEROCELE.

EPIPLOIS, in anatomy, a term applied to the arteries and veins diſtributed thro' the ſubſtance of the epiploon or caul: thus, the dextra epiplois is a branch of the right ſide of the cœliac artery, and the ſiniſtra epiplois and gaſtro-epiplois are terms by which anatomiſts call branches from the left ſide of the coeliac artery. See the articles COELIAC and ARTERY.

EPIPLOOMPHALON, ηπιπλοομφαλον, in medicine, an hernia umbilicalis, proceeding from the omentum falling into the region of the umbilicus or navel. See the article EXOMPHALUS.

EPIPLOON, the ſame with what is otherwiſe called omentum. See OMENTUM.

EPIPLOSARCOMPHALUS, in ſurgery, a kind of exomphalus. See the article EXOMPHALUS.

EPISCOPACY, the quality of epiſcopal government, or that form of church diſcipline, wherein dioceſan biſhops are eſtabliſhed diſtinct from and ſuperior to prieſts or preſbyters. See the article BISHOP.

EPISCOPALIANS, in church-hiſtory, an appellation given to thoſe who prefer the epiſcopal government and diſcipline to all others.

By the teſt act, none but epiſcopalians, or members of the church of England, are qualified to enjoy any office civil or military. See the article TEST ACT.

EPISODE, επεισοδιον, in poetry, a ſeparate incident, ſtory, or action, which a poet invents, and connects with his principal action, that his work may abound with a greater diverſity of events: though, in a more limited ſenſe, all the particular incidents whereof the action or narration is compounded, are called epiſodes. See the articles EPIC and TRAGEDY.

The epiſode, in its original, was only ſomething rehearſed between the parts of the chorus, or antient tragedy, for the diverſion of the audience. Epiſodes ſerve to promote the action, to illuſtrate, embelliſh, and adorn it, and carry it to its proper period. Epiſodes are either abſolutely neceſſary, or very requiſite. All epiſodes are incidents, tho' all incidents are not epiſodes; becauſe ſome incidents are not adventitious to the action, but make up the very form and ſeries of it. Examples will clear up this diſtinction: the ſtorm in the firſt Æneid of Virgil, driving the fleet on the coaſt of Carthage, is an incident, not an epiſode, becauſe the hero himſelf and the whole body of his forces are concerned in it; and ſo it is a direct and not a collateral part of the main action. The adventures of Niſus and Euryalus, in the ninth Æneid, are epiſodes, not incidents, *i. e.* not direct parts of the main action.

It is particularly by the art of epiſodes that the great variety of matter which adorns a poem is brought into the principal action: but though the epiſodes are a kind of digreſſion from the ſubject, yet they ought to have a natural relation to the principal action, never be far-fetched, and muſt be handled with judgment, to avoid confuſion and burdening the ſubject with too much action. Without this reſtriction the epiſode is no longer probable, and there appears an air of affectation which becomes ridiculous. Ariſtotle calls all thoſe fables epiſodic, which abound in epiſodes not neceſſarily nor properly connected with each other.

The moſt natural epiſodes are the propereſt to circumſtantiate the principal actions, namely, the cauſes, the effects, the beginnings, and the conſequences of it. Homer and Virgil have ſhewn their principal art in this particular: the action of the Iliad and that of the Æneid were in themſelves exceeding ſhort, but are ſo beautifully lengthened and diverſified by the intervention of epiſodes, that they make up an agreeable ſtory, ſufficient to employ the memory without overcharging it. See the article Epic.

Our noble poet Milton has excelled in this art; he has no other epiſodes than what naturally ariſe from the ſubject, and yet his poem of Paradiſe Loſt is filled with a multitude of aſtoniſhing incidents. Thoſe great actions, the battle of the angels, and the creation of the world, are by way of epiſode to this noble poem. With the like art, and in the ſame manner, in that part of it which regards the fall of man, he has related the fall of theſe angels who are his profeſſed enemies; beſides the many other beauties of ſuch an epiſode, its running parallel with the great action of the poem, hinders it from breaking unity ſo much as another epiſode would have done, that had not ſo great an affinity with the principal ſubject.

EPISODIC, an epithet given epic poems ſwelled too much with epiſodes. See the preceding article.

EPISPASTIC, in medicine, a topical remedy, which being applied to the external parts of the body, attracts the humours to that part. See Vesicatory.

EPISTATES, in the athenian government, was the preſident of the proedri. The conſtitution was this: the ten tribes of Athens elected every year by lot each of them fifty ſenators, which made a ſenate of five hundred; every tribe had the precedence in its turn, and ſurrendered it again ſucceſſively to another, the fifty ſenators in office were called prytanes. During the term or duration of their office, which was thirty-five days, ten of the fifty prytanes preſided weekly under the name of proedri; and of theſe proedri there was one to preſide each day of the week, under the title of epiſtates.

To the cuſtody of this officer was committed the public ſeal, and the keys of the citadel and the public exchequer: this therefore was an office of ſo great truſt and power, that no man was permitted by the laws to continue in it above one day, nor to be elected into it a ſecond time. The epiſtates were elected by lot out of the prytanes.

Epiſtates was alſo the preſident of the aſſembly, choſen by lot out of the proedri, the chief part of whoſe office ſeems to have conſiſted in granting the people liberty to give their voices, which they were not permitted to do till he had given the ſignal. If the people were remiſs in coming to the aſſemblies, the magiſtrates uſed their utmoſt endeavours to compel them, for they ſhut up all the gates, that only excepted through which they were to paſs to the aſſembly, and took care that all vendibles ſhould be taken out of the market, that there might be nothing to divert them from appearing.

EPISTEMONARCH, in the antient greek church, an officer of great dignity, who had the care of every thing relating to faith, in the quality of cenſor. His office anſwered pretty nearly to that of maſter of the ſacred palace at Rome.

EPISTLE, επιϛολη, denotes the ſame with a miſſive letter; but is now chiefly uſed in ſpeaking of antient writings, as the epiſtles of St. Paul, epiſtles of Cicero, epiſtles of Pliny, *&c.*

The epiſtles of St. Paul, which are fourteen in number, make part of the canon of the New Teſtament; beſides which there is one general epiſtle of St. James, two of St. Peter, three of St. John, and one of St. Jude.

Dedicatory EPISTLE, in matters of literature. See DEDICATION.

EPISTOLARY, ſomething belonging to an epiſtle. See the article EPISTLE.

The art of epiſtolary writing is acknowledged to be very entertaining and inſtructive. The Romans ranked it in the number of liberal and polite accompliſhments. And, indeed, it enters ſo much into all the occaſions of life, that no gentleman can avoid ſhewing himſelf in this kind of compoſition; the chief excellence of which conſiſts in expreſſing ordinary occurrences, in an elegant and uncommon manner. However, it is proper to obſerve, that ſuch is the nature of epiſtolary writings, in general, as unavoidably renders them obſcure, ſince the writer paſſes by many things, as being well known to him to whom the letter is addreſſed, which muſt be laid open to a ſtranger, before he can fully comprehend what is ſaid. Hence it is, that the epiſtles of the antients, whether ſacred or prophane, are ſo difficult to be underſtood.

EPISTROPHE, in rhetoric, a figure, wherein that which is ſuppoſed of one thing, is ſtrongly affirmed of another: thus, *Are they Hebrews? ſo am I. Are they Iſraelites? ſo am I. Are they of the ſeed of Abraham? ſo am I, &c.*

EPISTYLE, in the antient architecture, a term uſed by the Greeks for what we call architrave, *viz.* a maſſive piece of ſtone, or wood, laid immediately over the capital of a column. See ARCHITRAVE and COLUMN.

EPITAPH, a monumental inſcription in honour or memory of a perſon defunct, or an inſcription engraven or cut on a tomb, to mark the time of a perſon's deceaſe, his name, family; and, uſually, ſome eulogium of his virtues, or good qualities.

The elegance of an epitaph, as well as an elegy, chiefly conſiſts in an expreſſive brevity. The French have a proverb, *He lies like an epitaph*, by reaſon they ſometimes give characters abſolutely falſe. At Lacedæmon epitaphs were only allowed to thoſe who died in battle. The reſt of the Greeks allowed of epitaphs, the form of which was generally as follows:

ΝΙΚΩΝ ΖΗΝΩΝΟΣ
ΧΡΗΣΤΕ ΧΑΙΡΕ.

Nicon, ſon of Zenon,
Good man, happineſs to you.

ΟΛΥΜΠΙΑΣ
ΧΡΗΣΤΗ
ΧΑΙΡΕ.

Olympia,
Good woman,
Happineſs to you.

The Romans, in their epitaphs, introduced their dead ſpeaking, as in the following, wherein the dead wife thus beſpeaks her ſurviving huſband:

Immatura peri: ſed tu, felicior, annos
Vive tuos, conjux optime, vive meos.

Sometimes the roman epitaphs were full of moral expreſſions, and adorned with fine carved work, *&c.* At the top they always had the words DIIS MANIBUS. It has been much diſputed by learned men whether or no epitaphs were in uſe among the antient Hebrews: however this be, it is certain the Jews have, of a very antient date, received this cuſtom, of which Buxtorf produces ſeveral inſtances.

EPITASIS, in antient poetry, the ſecond part or diviſion of a dramatic poem, wherein the plot, entered upon in the firſt part, or protaſis, was carried on, heightened, and worked up, till arrived at its ſtate, or height, called cataſtaſis. See the articles PROTASIS, CATASTASIS, DRAMA, *&c.*

In the epitaſis, accidents, as they are called by the moderns, ariſe; all things are in confuſion, and involved in doubts and difficulties. Voſſius ſays, the epitaſis is contained in the ſecond; ſometimes in the third and fourth, but very rarely any part of it in the fifth act: but Dr. Trap ſays, that there is no act to which the epitaſis is not ſuitable; nay, that ſome of it ought always to be in the fifth act.

It is the epitaſis that ſupports the weight and burden of the poem; upon it the criſis of the action chiefly turns. This diviſion of tragedy is laid aſide in the modern drama, inſtead whereof plays are divided into acts. See the article ACT.

EPITASIS, in medicine, the increaſe of a diſeaſe, or beginning of a paroxyſm, particularly in a fever. See FEVER.

EPITHALAMIUM, in poetry, a nuptial ſong, or compoſition, in praiſe of the bride and bridegroom, praying for their proſperity, for a happy offspring, *&c.* Among the Greeks, the married couple were no ſooner bedded, than the young men and maids gathered round the door, dancing and ſinging the epithalamium, ſhouting and ſtamping with their feet, with intention to drown the maid's cries. When they returned again in the morning, to ſalute the married couple, they ſung the επιθαλαμια εγερτικα, ſo named from the deſign of them, which was to wake and ariſe the bridegroom and bride; as thoſe ſung the night before were deſigned to diſpoſe them to ſleep. and on that account, were termed επιθαλαμια κοιμητικὰ.

EPITHEM, in pharmacy, a kind of fomentation, or remedy of a ſpirituous or aromatic kind, applied externally to the regions of the heart, liver, *&c.* to ſtrengthen and comfort the ſame, or to correct ſome intemperature thereof. See the article FOMENTATION.

There are principally three kinds of theſe external applications, the liquid, the ſolid, and the ſoft or poultice-kind. The liquid epithems are ſometimes conſiderably thick; but when they are intended to penetrate deep, they are much better if very thin and fluid. As to the part to which the epithem is immediately applied, it is not what it is always intended to act upon, as this frequently lies deep within: the epithems, therefore, intended for this purpoſe, ſhould conſiſt of the moſt penetrating ingredients, for which reaſon aſtringents and inſpiſſating remedies can be of no uſe; but in this form hot wine alone is ſometimes uſed as an epithem, and often ſuch medicines as are not to be ſafely taken inwardly, ſuch as highly rectified ſpirits, preparations of lead, henbane, mandrake, and other poiſonous plants, and the like: but we are carefully to remember in regard to theſe, that the pores are capable of abſorbing them, and ought therefore to know the effects they are capable of producing, when thus abſorbed in the body. As to the vehicles of the liquid epithems, they are various, as linen or woollen-cloth, ſilk, ſtupes, toaſted bread, *&c.* They are in ſome caſes to be applied hot, in others, cold: when the intention is to reſolve, penetrate, and attract, then the hot are to be preferred; but theſe are injurious to parts conſtricted by intenſe cold.

The dry epithems are medicated powders, uſually ſewed up in a cloth, and applied to different parts of the body; for which purpoſe the powders muſt be coarſe. Sometimes the liquid epithems are added to the dry, to reduce the whole to a conſiſtence, ſuch as may be ſpread upon cloth, and applied.

Volatile EPITHEM, is a form of medicine preſcribed in the London Diſpenſatory, ordered to be made up of equal weights of common turpentine and ſpirit of ſal armoniac, by ſtirring them together in a mortar.

EPITHET, in poetry and rhetoric, an adjective expreſſing ſome quality of a ſubſtantive to which it is joined; or ſuch an adjective as is annexed to ſubſtantives by way of ornament and illuſtration, not to make up an eſſential part of the deſcription. Nothing, ſays Ariſtotle, tires the reader more than too great a redundancy of epithets, or epithets placed improperly; and yet nothing is ſo eſſential in poetry as a proper uſe of them. The writings of the beſt poets are full of them, eſpecially Virgil.

We may diſtinguiſh two kinds of epithets, *viz.* 1. Thoſe which add a new idea quite diſtinct from the general nature of a ſubſtantive. Thus Virgil in his Georgics,

> *Inter* cunctantes *cecidit, moribunda miniſtros.*

And, 2. Thoſe that bring with them ſome light and ornament, but not new ideas. Thus the ſame poet,

> Timidi *damæ, cervique* fugaces.

The firſt kind of epithets entertain the mind with a more agreeable variety, but thoſe of the ſecond require, perhaps, more care and judgment in the proper choice of them. For inſtance, becauſe Virgil has ſaid, *the fearful deer and fleeting ſtags,* it by no means follows that theſe epithets are applicable whenever ſtags and deer ſhall happen to be mentioned. They are proper in the place where he uſes them, but may not be ſo always.

EPITOME, in literary hiſtory, an abridgment or ſummary of any book, particularly of a hiſtory. See ABRIDGMENT. It is pretended that the epitomizing of authors, frequently occaſions the loſs of the originals. Thus the loſs of Pompeius Trogus, is inſcribed to his epitomiſer Juſtin; and the loſs of a great part of Livy, to Lucius Annæus Florus.

EPITRITUS, in proſody, a foot conſiſting of three long ſyllables and one ſhort. Of theſe, grammarians reckon four kinds; the firſt conſiſting of an iambus and ſpondee, as ſălūtāntēs: the ſecond, of a trocheus and ſpondee, as cōncĭtātī: the third, of a ſpondee and an iambus, as cōmmūnĭcāns: and the fourth, of a ſpondee and trocheus, as īncāntārĕ. See the articles SPONDEUS, TROCHEUS, *&c.*

EPITROCHASMUS, Επιτροχασμος, in rhetoric, a figure wherein we ſlightly paſs over ſeveral things of great moment, by only mentioning them in general. Such is the ſaying of Cæſar, *veni, vidi, vici.* And the following paſſage of Virgil, Æn. 4.

——Faces in caſtra tuliſſem,
Impleſſemque foros flammis, natumque patremque
Cum genere exſtinxem, memet ſuper ipſa dediſſem.

EPITROPE, in rhetoric, a greek term for the ſame figure which the Latins call conceſſio. See the article CONCESSION.

EPITROPUS, among the modern Greeks, a kind of arbitrator choſen by the greek chriſtians under the dominion of the Turks, to terminate their differences, and avoid carrying them before the turkiſh magiſtrates. See ARBITRATOR.

EPIZEUXIS, in rhetoric, a figure which repeats the ſame word, without any other intervening: ſuch is that of Virgil, *nunc, nunc, inſurgite remis.*

EPLOYÉ, in heraldry, the ſame with diſplayed. See the article DISPLAYED.

EPOCHA, in chronology, a term or fixed point of time, whence the ſucceeding years are numbered or accounted. See the article ÆRA.

The moſt remarkable epochas are thoſe that follow.

EPOCHA *of the creation of the world.* According to the vulgate, archbiſhop Uſher places this event 4004 years before the birth of Chriſt; Scaliger makes it 3950; Petavius, 3984; and Ricciolus, 4184 years before Chriſt. According to the ſeptuagint, Euſebius places the creation 5200 years before the nativity of our Lord; the alphonſine tables, 6934; and Ricciolus, 5634. The creation, therefore, as we follow the archbiſhop, happened in the year 710 of the julian period. See the article JULIAN PERIOD.

Sir Iſaac Newton, again, makes the creation of the world later by 500 years than all other chronologiſts; and the proofs by which this illuſtrious philoſopher ſupports his opinion, are of two different kinds. The Egyptians counted 341 generations from Menes to Setho, allowing an hundred years for three generations; and the antient Greeks computed one generation at about forty years. Now, ſays Sir Iſaac, it is true, three ordinary generations may be computed at about 120 years; but generations are longer than the reigns of kings, becauſe it is evident that mankind in general live longer than kings. The duration of a reign, therefore, taking one with another, is, according to him, about twenty years; whence he concludes, that the antients have erred in their calculation in allowing forty years for every generation. The ſecond kind of proof is taken from the preceſſion of the equinoxes. See the article PRECESSION, *&c.*

According to Clemens Alexandrinus, Chiron, who was in the expedition of the argonauts, fixed the vernal equinox at the fifteenth degree of aries, and conſequently the ſummer ſolſtice at the fifteenth degree of cancer. Meto fixed the ſummer ſolſtice at the eighth degree of cancer, a year before the peloponeſian war. Now ſince one degree anſwers to the retrograde motion of the equinoctial points in 72 years, there are ſeven times 72 years from the expedition of the argonauts to the beginning of the peloponeſian war; that is 504 years, and not 507 years, as the Greeks affirm. By combining theſe two different proofs, Sir Iſaac concludes, that the expedition of the argonauts ought to be placed 909 years before Jeſus Chriſt, and not 1400, as is generally believed; and therefore that the creation of the world ought to be placed about 500 years later than chronologiſts generally place it.

EPOCHA *of the deluge.* According to the hebrew text, there are 1656 years from the creation to the deluge; 1307, according to the Samaritan; 2242, according to Euſebius and the ſeptuagint; 2256, according to Joſephus and the Septuagint, and 2262, according to Julius Africanus, Petavius, and the Septuagint. In following the hebrew text, this epocha begins in the year 2366 of the julian period.

EPOCHA *of the olympiads*, uſed principally by the Greeks, had its origin from the olympic games, which were celebrated at the beginning of every fifth year. This epocha begins 776 years before the incarnation, or in the 3938 of the julian period.

Varronian EPOCHA *of the building of Rome*, is fixed 753 years before our Saviour's birth, and in the 3961 of the julian period.

EPOCHA *of Nabonaſſar king of Babylon*,

made uſe of by Ptolemy, Cenſorinus, and ſeveral other authors, began 747 years before the incarnation, and in the 3967 of the julian period.

Julian **EPOCHA.** The firſt year of Julius Cæſar's correcting the calendar ſtands 45 years before our Saviour's birth, and coincides with the 4669 of the julian period.

EPOCHA *of Chriſt*. The chriſtian world generally reckoned from the epocha of the creation, the building of Rome, the conſuls regiſter, or the emperor's reign, till about 500 years after Chriſt, when the epocha of the nativity of our bleſſed Lord was introduced by Dionyſius Exiguus. He began his account from the conception or incarnation properly called Lady-day. Moſt countries in Europe, however, at preſent reckon from the firſt of January next following, except the court of Rome, where the epocha of the incarnation ſtill obtains for the date of their bulls and briefs. But here we are to obſerve, that there are different opinions touching the year of our Saviour's birth. Capellus and Kepler fix it at about the 748th year from the building of Rome. Deckar and Petavius place the incarnation in the 749th of Rome. Scaliger and Voſſius make it fall on the 751ſt of Rome. Dionyſius Exiguus, Bede, *&c.* fix the birth of our Saviour to the year 751 of Rome; the diverſity of theſe opinions proceeding from the difficulty of fixing Herod the great's death, who, as is evident from the evangeliſts, was living at our Saviour's birth, the taxation of Cyrenius, and the time of our Saviour's beginning his miniſtry. But let this be as it will, it is generally agreed, that as to computation and uſe, the common epocha is to be followed, which places the birth of Chriſt in the 4713th of the julian period, although the true birth rather correſponds with the 4711th of the ſame period.

Diocleſian **EPOCHA**, or **EPOCHA** *of martyrs*, called alſo the æra of the copthi or Egyptians, becauſe the emperor Diocleſian made a great many martyrs in Egypt, begins in the year 283 of our lord, and the 4997 of the julian period.

EPOCHA *of the hegira*, or flight of Mahomet, uſed among the Turks, is the year of the julian period 5335, anſwering to the year of Chriſt 622.

Yezdejerdic, or *Perſian* **EPOCHA**, is the year of the julian period 5345, anſwering to the year 622.

To reduce the years of one epocha to thoſe of another, obſerve the following rule: add the given year of an epocha to the year of the julian period correſponding with its riſe, and that will give the year of the period.

For example, if to 1754, the preſent year of the chriſtian epocha, we add 4713, the year of the julian period correſponding with its riſe, the ſum, 6467, will be the preſent year of the julian period: now if we ſubtract from the year thus found, the year of the julian period correſponding with the riſe of any epocha, the remainder ſhews the true method of making a juſt connexion betwixt that epocha and the known year of Chriſt.

Again, if we want to find the year of the julian period correſponding to a given year before Chriſt, we ſubtract the given year from 4713, and the remainder is the year required.

Spaniſh **EPOCHA.** See the article ÆRA.

EPODE, in lyric poetry, the third or laſt part of the ode, the antient ode being divided into ſtrophe, antiſtrophe, and epode. See the articles ODE, *&c.*

The epode was ſung by the prieſts, ſtanding ſtill before the altar, after all the turns and returns of the ſtrophe and antiſtrophe, and was not confined to any preciſe number or kind of verſes.

The epode is now a general name for all kinds of little verſes that follow one or more great ones, of what kind ſoever they be; and in this ſenſe, a pentameter is an epode after an hexameter. And as every little verſe, which being put after another, cloſes the period, is called epode; hence the ſixth book of Horace's odes is entitled *Liber Epodon*, Book of Epodes, becauſe the verſes are all alternately long and ſhort, and the ſhort ones generally, though not always, cloſe the ſenſe of the long one.

EPOMIS, in anatomy, a muſcle, otherwiſe called deltoides. See DELTOIDES.

EPOPOEIA, in poetry, the ſtory, fable, or ſubject treated of, in an epic poem. See the article FABLE.

The word is commonly uſed for the epic poem itſelf. See the article EPIC.

EPOTIDES, in the naval architecture of the antients, two thick blocks of wood, one on each ſide the prow of a galley, for warding off the blows of the roſtra of the enemy's veſſels. See the articles GALLEY and ROSTRUM.

EPPINGEN, a town of Germany, ſituated about ten miles north of Hailbron.

EPSOM, a town of Surry, about fifteen miles ſouth-weſt of London; much reſorted to on account of its medicinal waters; from which the bitter purging ſalt being firſt extracted, got the name of epſom-ſalt. At preſent, however, the bitter purging ſalt is procured from the bittern, remaining after the cryſtallization of common ſalt; and this is found to anſwer all the purpoſes of that firſt obtained from Epſom-waters, and goes by its name.

Epſom-ſalt is eſteemed good in colics, the ſcurvy, diabetes, loſs of appetite, the rheumatiſm, jaundice, hypochondriac affection, and other chronic complaints. The beſt way of taking it is with any chalybeate waters, as thoſe of Tunbridge; for inſtance, a dram, or a dram and an half, diſſolved in the three or four firſt draughts.

EPULIDES, or Parulides, in ſurgery. See the article Parulides.

EPULONES, in roman antiquity, miniſters who aſſiſted at the ſacrifices, and had the care of the ſacred banquet committed to them. At firſt they were only three in number, but afterwards increaſed to ſeven. Their office was, to give notice when feaſts were to be held in honour of the gods; and, to take care that nothing was wanting towards the celebration. See the article Epulum.

EPULOTICS, επȣλωτικα, the ſame with cicatrizants. See Cicatrizants.

EPULUM, *banquet*, in antiquity, a holy feaſt prepared for the gods. The ſtatues of the gods were commonly laid upon a bed, and ſerved in the epula, as if they had been very hungry; to perform which was the function of the miniſters of ſacrifice, hence called *epulones*.

EQUABLE, an appellation given to ſuch motions as always continue the ſame in degree of velocity, without being either accelerated or retarded.

When two or more bodies are uniformly accelerated or retarded, with the ſame increaſe or diminution of velocity in each, they are ſaid to be equably accelerated or retarded.

EQUAL, a term of relation between two or more things of the ſame magnitude, quantity, or quality.

Mathematicians ſpeak of equal lines, angles, figures, circles, ratios, ſolids, &c. See the articles Line, Angle, &c.

EQUALITY, that agreement between two or more things, whereby they are denominated equal.

The equality of two quantities, in algebra, is denoted by two parallel lines placed between them: thus, $4+2=6$, that is, 4 added to 2, is equal to 6.

EQUANIMITY, in ethics, denotes that even and calm frame of mind and temper, under good or bad fortune; whereby a man appears to be neither puffed up, or overjoyed with proſperity; nor diſpirited, ſoured, or rendered uneaſy by adverſity.

EQUANT, in the old aſtronomy, a circle deſcribed on the center of the deferent, for accounting for the excentricity of the planets. See Excentricity.

EQUATION, in algebra, the mutual comparing two equal things of different denominations, or the expreſſion denoting this equality; which is done by ſetting the one in oppoſition to the other, with the ſign of equality ($=$) between them: thus $3\,s=36\,d$, or 3 feet$=$1 yard. Hence, if we put a for a foot, and b for a yard, we will have the equation $3\,a=b$, in algebraical characters.

When a problem is propoſed to be reſolved by means of equations, the firſt thing to be done is to form a clear conception of the conditions and nature of it; taking care to ſubſtitute the firſt letters of the alphabet for known quantities, and the laſt letters of the alphabet for unknown ones. Then by due reaſoning from the conditions of the queſtion, let the quantities concerned therein be juſtly ſtated, and carefully compared; ſo that their relation to one another may appear, and the difference, which renders them unequal, be diſcovered; and, conſequently, the ſame thing found expreſſible two ways, or brought into an equation, or ſeveral equations independent on each other. And here it is to be obſerved, 1. That if there are as many equations given, as there are quantities ſought, then the queſtion has a determinate number of ſolutions, or is truly limited, *viz.* each quantity ſought hath but one ſingle value. Thus, ſuppoſe a queſtion propoſed concerning the age of three perſons, was conditioned as follows, *viz.* the ſecond is ſeven years older than the firſt, the age of the third is triple that of the firſt and ſecond, and the ſum of all their ages is 68. Required the age of each. In order to bring this queſtion to an equation, put z for the age of the firſt; then will the age of the ſecond be $z+7$, and the age of the third $6\,z+21$: the ſum of all their ages $z+z+7+6\,z+21=68$. So that here is but one equation

equation given, and one quantity required, *viz.* the age of the firſt. 2. When the number of the quantities ſought exceed the number of the given equations, the queſtion is capable of an indeterminate number of anſwers; and, therefore, can be but imperfectly determined.

Reduction of EQUATIONS. If the queſtion, when ſtated, is found to have a determinable number of ſolutions, then the equation, directly drawn from the conditions of the queſtion, muſt be reduced into another, by equal augmentation and diminution; ſo that the known quantities may ſtand on one ſide, and one of the unknown quantities, or ſome power of it, on the other ſide of the equation. This is called reduction of equations, and depends upon a right application of the five following axioms: 1. If equal quantities be added to equal quantities, the ſum of thoſe quantities will be equal. 2. If equal quantities be ſubtracted or taken from equal quantities, the quantities remaining will be equal. 3. If equal quantities be multiplied by equal quantities, their products will be equal. 4. If equal quantities be divided by equal quantities, their quotients will be equal. 5. Quantities that are equal to one and the ſame thing, are alſo equal to one another.

If theſe axioms be well underſtood, the reduction of equations will appear very plain, and the operations be eaſily performed. 1. Reduction by tranſpoſition, is performed by transferring a quantity to the other ſide of the equation with a contrary ſign; or by equal addition, if the quantity be negative; and by equal ſubtraction, if affirmative. Thus the equation $x - 10 = 40$, is reduced by adding $+ 10$ to each ſide, and the reſult will be the ſame as if $- 10$ had been tranſpoſed to the oppoſite ſide with the contrary ſign; for $x - 10 + 10 = 40 + 10$, is the ſame with $x = 40 + 10$, the $- 10$ and $+ 10$ deſtroying each other. In the ſame manner $x + 10 = 40$, is reduced to $x = 40 - 10$, by tranſpoſing the $+ 10$ with a contrary ſign. 2. Reduction is performed by equal multiplication, in caſe there are fractional quantities; for by multiplying every term in the equation by the denominators of the fractions, it will be cleared of fractions: thus by multiplying every term of the equation $\frac{z}{a} = b$ by the denominator a, we will have $z = ab$. Again, if $\frac{z^3 + 3a^2}{c} + n + a = z + a$; then by multiplying by the denominator c, we will have an equal equation free from fractions, *viz.* $z^3 + 3a^2 + cn + ac = cz + ac$, or $z^3 + 3a^2 + cn = cz$, the ac on each ſide being rejected. 3. By equal diviſion, as in the equation $ax = c$; for by dividing each ſide by a, we will have $x \left(\text{or} \frac{ax}{a}\right) = \frac{c}{a}$. In the ſame manner, in the equation $az + ez = cb$, by dividing each ſide by $a + e$, we get the equation $z = \frac{cb}{a+e}$. 4. Equations are cleared of ſurd quantities by involution: thus, if the equation be $\sqrt{a} = 6$; then by involution or ſquaring each ſide of the equation, we have the equation $a = 36$. If both ſides be ſimilar ſurds, or of the ſame power, all that we have to do is to reject the radical ſign: thus, for $\sqrt{a} = \sqrt{d + c}$, we write $a = d + c$, rejecting the radical ſign of both. 5. When any ſingle power of the unknown quantity is on one ſide of the equation, evolve or extract the root of both ſides, according as the index of that power denotes, and their roots will be equal. Thus if $zz = 25$, by extracting the root of each ſide we have $z = 5$. In the ſame manner, if $aaa = 27$, their cube roots will be equal, *viz.* $a = 3$. Or, if any compound power of the unknown quantity be on one ſide of an equation, that hath a true root of its kind; then, by evolving both ſides of the equation, it will be expreſſed in lower terms: for example, $a^2 + 2ba + b^2 = d^2$, by evolving both ſides, comes out $a + b = d$. 6. A proportion may be converted into an equation, aſſerting the product of the extremes to be equal to that of the means; or, any one of the extremes may be made equal to the product of the means divided by the other extreme: thus, if $12 - x : \frac{x}{2} :: 4 : 1$, then $12 - x = 2x$; and by tranſpoſing the $-x$, we will have $3x = 12$, and dividing by 3, $x = \frac{12}{3} = 4$, by the preceding rules. 7. If any quantities be found on both ſides of the equation, with the ſame ſign prefixed, they may be taken away from both: thus, for $3x + b = a + b$, we ſay $3x = a$. Alſo, if all the quantities of the

the equation be multiplied or divided by the ſame quantity, it may be ſtruck out of them all: thus, if $3ax+5ab=8ac$, dividing by a, we have $3x+5b=8c$; and tranſpoſing $5b$ and dividing by 3, we have $x=\frac{8c-5b}{3}$, according to the firſt and third rules. 8. Inſtead of any quantity in an equation, you may ſubſtitute another equal to it: thus, if $3x+y=24$, and $y=9$; then $3x+9=24$, or $x=\frac{24-9}{3}=5$.

Solution of ſimple EQUATIONS. 1. After an equation is formed, if you have only one unknown quantity, then, by the preceding rules, bring it to ſtand alone on one ſide, ſo as to have none but known quantities on the other ſide; by which means you will diſcover its value. Thus, if the queſtion propoſed be that of the three perſons ages already mentioned, the equation thence reſulting has been found to be as in

Example I.

By queſt.	1	$z+z+7+6z+21=68$
1 tranſp.	2	$8z=68-28=40$
$2 \div 8$	3	$z=\frac{40}{8}=5=$ firſt age.
Hence	4	$z+7=12=$ ſecond age.
And	5	$\overline{12+5}\times 3=51=$ third age.

Example II.

$$\frac{3x}{4}\times\frac{x}{12}=x$$

$$\frac{3x^2}{48}=x$$

and $3x^2=48x$ by the ſecond rule.
and $3x=48$ by the ſeventh rule.
and $x=\frac{48}{3}=16$ by the third rule.

2. If there are two unknown quantities, then there muſt be two equations ariſing from the conditions of the queſtion; ſuppoſe x and y. The rule is, to find a value of x or y from each of the equations, and then by putting theſe two values equal to each other, there will ariſe a new equation involving only one unknown quantity, which muſt be reduced by the ſame rules as formerly. Example: let the ſums of two quantities be s, and their difference d; let s and d be given, and let it be required to find the quantities themſelves. Suppoſe the quantities to be x and y; then, by the queſtion, $x+y=s$, and $x-y=d$; whence $x=s-y=d+y$; and, by tranſpoſition, $2y=s-d$; ſo that dividing by 2, we have $y=\frac{s-d}{2}$; and by comparing the value of x, viz. $s-y$, we find $x=s-\frac{s+d}{2}$, or $2x=2s-s+d$, and dividing by 2, the value of $x=\frac{s+d}{2}$, as expreſſed in the margin.

$$\begin{aligned}
x+y&=s\\
x-y&=d\\
\hline
x&=s-y\\
x&=d+y\\
s-y&=d+y\\
2y&=s-d\\
y&=\frac{s-d}{2}\\
x&=\frac{s+d}{2}
\end{aligned}$$

3. When in one of the given equations, the unknown quantity is of one dimenſion, and in the other of a higher dimenſion; you muſt find a value of the unknown quantity from that equation where it is of one dimenſion, and then raiſe that value to the power of the unknown quantity in the other equation; and by comparing it, ſo involved, with the value you deduce from that other equation, you will obtain an equation that will have only one unknown quantity and its powers: that is, when you have two equations of different dimenſions, if you cannot reduce the higher to the ſame dimenſion with the lower, you muſt raiſe the lower to the ſame dimenſion with the higher. Example: the ſum of two quantities, and the difference of their ſquares, being given, to find the quantities themſelves. Suppoſe them to be x and y, their ſum s, and the difference of their ſquares d. Then,

$$\begin{aligned}
&x+y=s\\
&x^2-y^2=d\\
\hline
&x=s-y\\
&x^2=s^2-2sy+y^2\\
&x^2=d+y^2\text{, whence}\\
&d+y^2=s^2-2sy+y^2\\
&d=s^2-2sy\\
&2sy=s^2-d\\
&y=\frac{s^2-d}{2s}\\
&\text{and } x=\frac{s^2+d}{2s}.
\end{aligned}$$

4. If there are three unknown quantities, there muſt be three equations in order to determine them, by comparing which you may, in all caſes, find an equation involving only one unknown quantity; which may be reſolved by the rules for reduction of equations already mentioned.

From three equations involving any three unknown quantities, x, y, and z, to deduce two equations involving only two unknown quantities, the following rule will always ſerve; find three values of x from the three given equations; then, by comparing the firſt and ſecond value, you will find another equation involving only y and z: again, by comparing the firſt and third, you will find another equation involving only y and z; and, laſtly, thoſe equations are to be ſolved by the ſecond direction.

Example: ſuppoſe

$$\left.\begin{array}{l} x+y+z=12\\ x+2y+3z=20\\ \frac{x}{3}+\frac{y}{2}+z=6\end{array}\right\}\text{then } x=\left\{\begin{array}{l}12-y-z\\ 20-2y-3z\\ 18-\frac{3y}{2}-3z\end{array}\right\}\left\{\begin{array}{l}\text{firſt}\\ \text{ſecond}\\ \text{third}\end{array}\right\}\text{value,}$$

$$12-y-z=20-2y-3z$$

$$12-y-z=18-\frac{3y}{2}-3z$$

Theſe two laſt equations involve only y and z, and are to be reſolved by the ſecond direction. Thus,

$$\left\{\begin{array}{l}2y-y+3z-z=20-12=8\\ y+2z=8\end{array}\right.$$

$$\left\{\begin{array}{l}36-3y-6z=24-2y-2z\\ 12=y+4z\end{array}\right.$$

$$\text{whence } y=\left\{\begin{array}{l}8-2z \text{ firſt}\\ 12-4z \text{ ſecond}\end{array}\right\}\text{value}$$

$$\text{and } 8-2z=12-4z$$

$$2z=12-8=4$$

$$z=\tfrac{4}{2}=2$$

$$y(=8-2z)=4$$

$$x(=12-y-z)=6$$

This method is general, and will extend to all equations that involve three unknown quantities; but there are often eaſier and ſhorter methods, to deduce an equation involving only one unknown quantity, which is beſt learned from practice.

Solution of quadratic EQUATIONS. 1. If, after the equation is reduced as directed above, and the unknown quantity brought to ſtand on one ſide, it is found to be a ſimple ſquare power, all that you have to do is to evolve both ſides of the equation, by which means you will find the value of the ſimple unknown quantity. Thus, if $xx=36$; then, by evolution or extraction, $x=6$. See the article EXTRACTION.

2. In the ſolution of any queſtion, where you have got an equation that involves only one unknown quantity, but involves at the ſame time the ſquare of that quantity, and the product of it multiplied by ſome known quantity; then you have what is called an adfected quadratic equation, which may be reſolved by the following rules: 1. Tranſpoſe all the terms that involve the unknown quantity to one ſide, and the known terms to the other ſide of the equation. 2. If the ſquare of the unknown quantity is multiplied by any coefficient, you are to divide all the terms by that coefficient, that the coefficient of the ſquare of the unknown quantity may be unit. 3. Add to both ſides the ſquare of half the coefficient prefixed to the unknown quantity itſelf, and the ſide of the equation that involves the unknown quantity will then be a complete ſquare. 4. Extract the ſquare root from both ſides of the equation, which you will find, on one ſide, always to be the unknown quantity with half the foreſaid coefficient ſubjoined to it; ſo that by tranſpoſing this half, you may obtain the value of the unknown quantity expreſſed in known terms. Thus, ſuppoſe the quadratic equation to be,

$$y^2+ay=b$$

$$\left.\begin{array}{r}\text{Add the ſquare of } \frac{a}{2}\\ \text{to both ſides,}\end{array}\right\}y^2+ay+\frac{a^2}{4}=b+\frac{a^2}{4}$$

$$\text{Extract the root,}\qquad y+\frac{a}{2}=\pm\sqrt{b+\frac{a^2}{4}}$$

$$\text{Tranſpoſe } \frac{a}{2}, \text{ and}\qquad y=\sqrt{b+\frac{a^2}{4}}-\frac{a}{2}$$

Here it is to be obſerved, that the ſquare root of any quantity, as $+a^2$, may be $+a$, or $-a$; and hence all quadratic equations admit of two ſolutions. Alſo, ſince the ſquares of all quantities are poſitive, it is evident that the ſquare root of a negative quantity is imaginary, and cannot be aſſigned. However, the following examples will illuſtrate the rules for quadratic equations.

Example I. The ſum of two quantities is 32, and their product 240; required the quantities themſelves? Suppoſe them to be x and y: then

$$x + y = 32;\ \text{and}\ x = 32 - y$$

$$xy = 240;\ \text{and}\ x = \frac{240}{y}$$

---

therefore $32 - y = \dfrac{240}{y}$

and $32y - y^2 = 240$

tranſpoſe, $y^2 - 32y = -240$

add 16^2, $y^2 - 32y + 256 = -240 + 256$

extract $\surd$, $y - 16 = \pm\sqrt{16}$

and $y = \pm\sqrt{16} + 16 = 20$

$\therefore x (= 32 - y) = 12$

Example II. Three merchants join ſtocks; the ſtock of the firſt was leſs than that of the ſecond by 13 l. and the ſum of the ſecond and third man's ſtock amounted to 175 l. In trading they gained 48 l. more than their whole ſtock was; and the firſt man's ſhare of the gain was 78 l. required each man's ſtock and ſhare of the gain?

Suppoſe	1	z, y, x, to repreſent each man's ſtock,
Then	2	$x + y + z = s =$ the whole ſtock,
	3	$s + 48 =$ the whole gain.
By the queſtion	4	$x + 13 = y$
	5	$y + z = 175$
$5 + x$	6	$x + y + z = 175 + x$
2, 6	7	$s = 175 + x$
7, 3	8	$s + 48 = 223 + x$
By the queſtion	9	$175 + x : 223 + x :: x : 78$
9 ×	10	$x^2 + 223x = 78x + 13650$
$10 - 78x$	11	$x^2 + 145x = 13650$
11 $\square$	12	$x^2 + 145x + 5256{,}25 = 18906{,}25$
12 vw^2	13	$x + 72{,}5 = \sqrt{18906{,}25} = 137{,}5$
$13 - 72{,}5$	14	$x = 137{,}5 - 72{,}5 = 65$
14, 4	15	$y = x + 13 = 78$
5, 15	16	$z = 175 - y = 97$
Then	17	$65 + 78 + 97 + 48 = 288$ the whole gain
And	18	y's gain $= 93$ l. 12 s. and z's $= 116$ l. 8 s.

Solution of cubic EQUATIONS. The ſecond term of a cubic equation can be taken away, ſo that it may be transformed to this form $x^3 * + qx + r = 0$. See TRANSFORMATION *of Equations.*

Let us ſuppoſe that $x = a + b$; and $x^3 + qx + r = a^3 + 3a^2b + 3ab^2 + b^3 + qx + r = a^3 + 3ab \times \overline{a + b} + b^3 qx + r = a^3 + 3abx + b^3 + qx + r =$ (by ſuppoſing $3ab = -q$ $a^3 + b^3 + r = 0$. But $b = -\dfrac{q}{3a}$, and $b^3 = -\dfrac{q^3}{27a^3}$, and conſequently $a^3 - \dfrac{q^3}{27a^3} + r = 0$; or, $a^6 + ra^3 = \dfrac{q^3}{27}$. Suppoſe $a^3 = z$, and you have $z^2 + rz = \dfrac{q^3}{27}$; which is a quadratic, the reſolution whereof gives

$$z = -\tfrac{1}{2}r \pm \sqrt{\tfrac{1}{4}r^2 + \frac{q^3}{27}} = a^3,\ \text{and}$$

$$a = \sqrt[3]{-\tfrac{1}{2}r \pm \sqrt[2]{\tfrac{1}{4}r^2 + \frac{q^3}{27}}};\ \text{and}$$

$$x = a + b = a - \frac{q}{3a} = \sqrt[3]{-\tfrac{1}{2}r \pm \sqrt[2]{\tfrac{1}{4}r^2 + \frac{q^3}{27}}}$$

$$\frac{q}{3 \times \sqrt[3]{-\tfrac{1}{2}r \pm \sqrt[2]{\tfrac{1}{4}r + \frac{q^3}{27}}}}$$

in which expreſſions there are only known quantities. This method is commonly called Cardan's rule.

But when, in a cubic equation $x^3-qx\pm r$, q is negative; in this caſe the expreſſion $\sqrt{\frac{1}{4}r^2+\frac{1}{27}q^3}$, will be transformed into $\sqrt{\frac{1}{4}r^2-\frac{1}{27}q^3}$; which root becomes impoſſible, or imaginary, when $\frac{1}{27}q^3$ is greater than $\frac{1}{4}r^2$, as being the ſquare root of a negative quantity. And yet, even in this caſe, the root x may be a real quantity; though algebraiſts have not, hitherto, been able to find a real expreſſion of its value. See the article IRREDUCIBLE.

Again, any cubic equation may be reduced to this form, and the value of x diſcovered, without exterminating the ſecond term.

$$\left.\begin{array}{r} x^3-3px^2-3qx-2r \\ +3p^2x-p^3 \\ +pq \end{array}\right\}=0;$$ which

by ſuppoſing $x=z+p$, will be reduced to $x^3 * -3qz-2r=0$, in which the ſecond term is wanting. But, from what is advanced above, it follows that $z=\sqrt[3]{r+\sqrt{r^2-q^3}}+\sqrt[3]{r-\sqrt{r^2-q^3}}$ = (if you ſuppoſe that the cubic root of the binomial $r+\sqrt{r^2-q^3}$ is $m+\sqrt{n}$) $=m+\sqrt{n}+m-\sqrt{n}=2m$. And, ſince $x=z+p$, it follows that $x=p+2m$. But, as the ſquare root of any quantity is twofold, ſo the cubic root is threefold, and can be expreſſed three different ways. See the article ROOT.

Example: let it be required to find the roots of the equation $x^3-12x^2+41x-42=0$;

Comparing the coefficients of this equation with theſe of the general equation, *viz.*

$$\left. x^3-3px^2\left.\begin{array}{r}-3q\\+3p^2\end{array}\right\}x\begin{array}{r}-2r\\-p^3\\+3pq\end{array}\right\}=0,$$ you

will find $3p=12$, ſo that $p=4$; $3p^2-3q\ (=48-3q)=41$, ſo that $q=\frac{7}{3}$; and $3pq-p^3-2r\ (=-36-2r)=42$ ſo that $r=3$. And conſequently $r^2-q^3=9-\frac{343}{27}=-\frac{100}{27}$, and $r+\sqrt{r^2-q^3}=3+\sqrt{-\frac{100}{27}}$. Now the cubic root of this binomial is found to be $-1+\sqrt[2]{-\frac{4}{3}}$ $(=m+\sqrt{n})$; whence

1°. $x=p+2m=4-2=2$.

2°. $x=p-m-\sqrt{-3n}=4+1-\sqrt{4}=5-2=3$.

3°. $x=p-m+\sqrt{-3n}=5+2=7$.

So that the three roots of the propoſed equation are 2, 3, and 7.

Solution of biquadratic EQUATIONS. The roots of theſe may be found by reducing them to cubic ones, thus:

Let the ſecond term be taken away, as directed under the article TRANSFORMATION *of equations.*

And let the equation that reſults, be $x^4 * +qx^2+rx+s=0$. Suppoſe this biquadratic to be the product of theſe two quadratic equations.

$$x^2+ex+f=0.$$
$$\underline{x^2-ex+g=0}$$
$$\left.\begin{array}{r}x^4 * +f\\+g\\-e^2\end{array}\right\}\times x^2\left.\begin{array}{r}+eg\\-ef\end{array}\right\}\times x+fg=0.$$

Where e is the coefficient of x in both equations, but affected with contrary ſigns; becauſe when the ſecond term is wanting in an equation, the ſum of the affirmative roots muſt be equal to the ſum of the negative.

Compare now the propoſed equation with the above product, and the reſpective terms put equal to each other, will give $f+g-e^2=q$, $eg-ef=r$, and $fg=s$. Whence it follows, that $f+g=q+e^2$, and $g-f=\frac{r}{e}$; and conſequently, $f+g+g-f\ (=2g)=q+e^2+\frac{r}{e}$, and $g=\frac{q+e^2+\frac{r}{e}}{2}$. In the ſame manner you will find, by ſubtraction, &c. $f=\frac{q+e^2-\frac{r}{e}}{2}$, and $f\times g\ (=s)=\frac{1}{4}\times\overline{q^2+2qe^2+e^4-\frac{r^2}{e^2}}$; and, multiplying by $4e^2$, and ranging the terms, you have this equation, $e^6+2qe^4+\overline{q^2-4s}\times e^2-r^2=0$. Suppoſe $e^2=y$, and it becomes $y^3+2qy^2+q^2-4s\times y-r^2=0$, an equation whoſe roots are to be diſcovered by the method of reſolving cubic equations.

Then the values of y being found, their ſquare roots will give e (ſince $y=e^2$;

and having e, you will find f and g, from the equations $f = \dfrac{q + e^2 - \frac{r}{e}}{2}$, and $g = \dfrac{q + e^2 + \frac{r}{e}}{2}$. Laſtly, extracting the roots of the roots of the equations $x^2 + ex + f = 0$, and $x^2 - ex + g = 0$, you will find the four roots of the biquadratic $x^4 * + qx^2 + rx + s = 0$; for either $x = -\frac{1}{2}e \pm \sqrt{\frac{1}{4}e^2 - f}$, or $x = + \frac{1}{2}e \pm \sqrt{\frac{1}{4}e^2 - g}$. Or you may find the roots of a biquadratic, without taking away the ſecond term. Suppoſe it to be of this form,

$$x^4 - 4px^3 \left.\begin{matrix} -2q \\ +4p^2 \end{matrix}\right\} x^2 \left.\begin{matrix} -8r \\ +4pq \end{matrix}\right\} x \left.\begin{matrix} -4s \\ +q^2 \end{matrix}\right\} = 0.$$

then the values of x will be

$$\left.\begin{matrix} x = p - a \pm \sqrt{p^2 + q - a^2 - \frac{2r}{a}} \\ \text{and } x = p + a \pm \sqrt{p^2 + q - a^2 + \frac{2r}{a}} \end{matrix}\right\}$$

where a^2 is equal to the root of the cubic equation

$$y^3 \left.\begin{matrix} -p^2 \\ -q \end{matrix}\right\} y^2 \left.\begin{matrix} +2pr \\ +s \end{matrix}\right\} y - r^2 = 0.$$

Every equation has as many roots, as the unknown quantity of the firſt term has dimenſions, or as the exponent thereof contains units. See the articles ROOT and EXPONENT.

All equations have as many affirmative roots as there are permutations of ſigns; and as many negative roots as there are ſucceſſions of them: thus, in the quadratic $x^2 + x - 6 = 0$, there is only one ſucceſſion of ſigns, + +; and one permutation of them, + −; hence the equation has two roots, one affirmative +2, and the other negative −3. Alſo in the cubic equation $x^3 - 3x^2 - 10x + 24 = 0$, there are two permutations of ſigns, + − and − +; and only one ſucceſſion − −: hence its roots are found to be two affirmative +2 and +4, and only one negative −3.

For the methods of approximating to the roots of equations, by means of their limits and ſerieſes, ſee the articles LIMIT and SERIES.

Conſtruction of EQUATIONS. See the article CONSTRUCTION.

Exponential EQUATION. See the article EXPONENTIAL.

Tranſcendental EQUATION. See the article TRANSCENDENTAL.

Annual EQUATION of the mean motion of the ſun, and moon's apogee and nodes. The annual equation of the ſun's mean motion depends upon the excentricity of the earth's orbit round him, and is $16\frac{11}{12}$ ſuch parts, of which the mean diſtance between the ſun and the earth is 1000; whence ſome have called it the equation of the center, which, when greateſt, is 1° 56′ 20″.

The equation of the moon's mean motion is 11′ 40″; of the apogee, 20′; and of its node, 9′ 30″.

Theſe four annual equations are always mutually proportionable to each other; ſo that when any of them is at the greateſt, the three others will alſo be greateſt; and when one diminiſhes, the reſt diminiſh in the ſame ratio. Wherefore the annual equation of the center of the ſun being given, the other three correſponding equations will be given; ſo that one table of the central equations will ſerve for all. See the article MOON.

EQUATION *of a curve*, an equation expreſſing the nature of a curve, the relation between an abciſs and a correſponding ordinate, or the relation of their fluxions. See the article CURVE.

EQUATION *of time*, in aſtronomy and chronology, the reduction of the apparent time or motion of the ſun, to equable, mean, or true time.

The difference between true and apparent time ariſes from two cauſes, the excentricity of the earth's orbit, and the obliquity of the ecliptic. Thus,

If the earth revolved in the plane of the equator, and in a circle about the ſun, then would the angle A S B (pl. XCIII. fig. 4, n° 1.) and conſequently the angle eBm, be always of the ſame quantity; and, therefore, the time of deſcribing the ſaid angle, eBm, would always be equal; and the ſolar days and hours be equal among themſelves. But neither of theſe two caſes have place in nature; for the earth's orbit being an ellipſis, her annual motion cannot be equable, or the angle ASB (*ibid.*) deſcribed in the ſame ſpace of time, will not be always equal; ſince, in the aphelium, the velocity of the earth will be leſs than in the perihelium, and conſequently the arch A B, and the ſimilar arch em, will be leſs; and, therefore, likewiſe the time of deſcribing it. But the moſt conſiderable part of the equation of time is that which ariſes from the plane of the earth's orbit, or ecliptic, being inclined to that of the equator, or plane of the diurnal motion. To explain this

this, let ♈ ♑ ♎ (*ibid.* n° 2.) be a ſemi-circle of the ecliptic, and ♈ H ♎ of the equinoctial, S the center of the ſun, and A that of the earth, in the third quarter of the ecliptic, ♑ ♎; *b f* the meridian paſſing through the true ſun S, and its apparent place at I, in the firſt quarter of the ecliptic ♈ ♋. Suppoſe now the motion of the earth in every reſpect equable, and firſt that it ſet out from ♎, and proceeded in the equinoctial in a given time to D; the ſun would apparently deſcribe, in the ſame time, the arch of the equinoctial ♈ I. Again, ſuppoſe it ſet out from the ſame point, ♎, and ſpent the ſame time, with the ſame equable velocity, in the ecliptic, it would arrive to the point A; ſo that the arch ♎ A = ♎ D, and ♈ I = ♈ C. Then it is evident, as the earth revolves about its axis from weſt to eaſt, the meridian of any place will firſt arrive at the ſun I, in the ecliptic, and afterwards at the ſun C, in the equinoctial; that is, the time of noon by the ſun in the ecliptic will be ſooner than that by the ſun in the equinoctial, by the quantity of the arch *b* D, turned into time.

Now the arch *b* D = B C is the difference of the ſun's longitude ♈ I or ♈ C, and his right aſcenſion ♈ B. Draw *ge* parallel to D C, and the angle *e* A *f* will be equal to the angle D S *b*, and the arch *ef* ſimilar to the arch D *b*. Therefore, the time in which the meridian *bf* revolves into the ſituation *eg*, is that which is to be added to the ecliptic noon, to equate it with the time of the equinoctial noon, in the firſt and third quarters of the ecliptic. In the ſecond and fourth quarters the ſaid equation is to be ſubtracted, as would eaſily appear, by making the ſame conſtruction there.

Since, in different parts of the quadrant this arch D *b*, or B C, is of different lengths, the equation of time will be a variable quantity; and, therefore, as the motion and time meaſured by the ſun in the equinoctial is always equal, it follows that the times meaſured by the ſun in the ecliptic muſt be always unequal; or, in other words, the ſolar days are ſometimes ſhorter, ſometimes longer, than the equal time meaſured out in the equinoctial.

As the true motion of the earth precedes its mean motion in the firſt ſemi-circle of anomaly, and is preceded by the mean in the ſecond, it follows, that while the earth is going from the aphelium to the perihelium, or while the ſun apparently moves from the apogæum to the perigæum, the apparent time will be before the mean; and, in the other ſemi-circle of anomaly, it will be after it. The difference of theſe motions, converted into time, is the equation of time in this reſpect, and is to be ſubtracted from the apparent time to gain the mean, or added to the mean to gain the apparent, in the firſt ſemi-circle of anomaly; and, *vice verſa*, in the latter.

Both theſe parts of the equation of time are calculated by aſtronomers for every degree of the ſun's longitude in the ecliptic, and diſpoſed in tables with directions for adding or ſubtracting, as the caſe requires; by which means the true equal time may, at all times, be had.

From what has been ſaid it appears, that the apparent time, or that ſhewn by a ſun-dial, is but four days in the whole year the ſame with the mean or equal time, ſhewn by a good clock or watch, *viz.* about April 15, June 17, Aug. 31, and Dec. 24. It is alſo remarkable, that about the third of November the equation is greateſt of all, clocks being then about 16′ 13″ ſlower than ſun-dials.

As, therefore, the ſolar days are unequal, the hours muſt be ſo of courſe; and, according as the above-mentioned cauſes, which are independent on each other, concur, or counteract each other, this inequality is more or leſs. Beſides, as the former of theſe cauſes, *viz.* the excentricity of the earth's orbit, is affected by the preceſſion of the equinoxes, tables of the equation of time, made for any year, muſt continually afterwards deviate more and more from the truth; yet, as this variation is extremely ſlow, the ſame tables may very well ſerve for an age, or more, without any ſenſible error.

Here follows a table of the equation of time, calculated for the new or gregorian ſtile, and ſhewing how much equal or true time is faſter or ſlower than apparent time, for every day throughout the year; or, which comes to the ſame thing, how many minutes or ſeconds a good clock or watch is faſter or ſlower than a good ſun-dial.

	Januar.		Febr.		March		April		May		June		July		Auguſt		Sept.		Octob.		Nov.		Dec.	
	Faſter		Faſter		Faſter		Faſter		Slower		Slower		Faſter		Faſter		Slower		Slower		Slower		Slower	
Days.	Min.	Sec.	Min.	Sec.	Min.	Sec.	Min.	Sec.	Min.	Sec.	Min.	Sec.	Min.	Sec.	Min.	Sec.	Min.	Sec.	Min.	Sec.	Min.	Sec.	Min.	Sec.
1	4	6	14	13	12	48	4	1	3	8	2	47	3	8	5	46	0	18	10	23	16	13	10	32
2	4	34	14	20	12	36	3	43	3	16	2	38	3	19	5	42	0	36	10	42	16	13	10	9
3	5	2	14	27	12	23	3	25	3	23	2	29	3	31	5	38	0	55	11	0	16	13	9	45
4	5	30	14	32	12	9	3	6	3	30	2	19	3	42	5	33	1	14	11	18	16	12	9	20
5	5	57	14	37	11	55	2	48	3	36	2	9	3	52	5	28	1	34	11	36	16	10	8	55
6	6	24	14	41	11	41	2	30	3	42	1	59	4	2	5	22	1	54	11	53	16	8	8	29
7	6	50	14	44	11	26	2	13	3	47	1	48	4	12	5	15	2	14	12	10	16	4	8	3
8	7	16	14	47	11	11	1	55	3	51	1	37	4	22	5	8	2	34	12	27	16	0	7	37
9	7	41	14	48	10	56	1	38	3	55	1	26	4	31	5	0	2	54	12	43	15	54	7	10
10	8	6	14	49	10	40	1	21	3	58	1	14	4	40	4	52	3	14	12	58	15	48	6	42
11	8	30	14	49	10	24	1	4	4	0	1	2	4	48	4	43	3	35	13	13	15	41	6	14
12	8	59	14	48	10	7	0	48	4	2	0	50	4	56	4	34	3	55	13	28	15	34	5	46
13	9	22	14	47	9	50	0	32	4	4	0	38	5	4	4	24	4	16	13	42	15	25	5	18
14	9	44	14	44	9	33	0	16	4	5	0	26	5	11	4	13	4	37	13	56	15	16	4	49
15	10	5	14	41	9	16	0 **	1	4	5	0	13	5	17	4	2	4	58	14	9	15	6	4	19
16	10	26	14	37	8	58	0	14	4	5	0 **	1	5	23	3	50	5	19	14	22	14	55	3	50
17	10	46	14	33	8	40	0	29	4	4	0	12	5	29	3	38	5	40	14	33	14	43	3	20
18	11	5	14	28	8	22	0	43	4	2	0	25	5	34	3	26	6	1	14	45	14	30	2	51
19	11	24	14	22	8	4	0	57	4	0	0	38	5	39	3	12	6	22	14	56	14	16	2	21
20	11	42	14	15	7	46	1	11	3	58	0	50	5	43	2	59	6	42	15	6	14	2	1	51
21	11	59	14	8	7	27	1	24	3	55	1	3	5	46	2	45	7	3	15	15	13	46	1	20
22	12	15	14	0	7	9	1	37	3	51	1	16	5	49	2	30	7	24	15	24	13	30	0	50
23	12	30	13	52	6	50	1	49	3	47	1	29	5	51	2	15	7	44	15	32	13	13	0 **	20
24	12	45	13	43	6	31	2	1	3	42	1	42	5	53	2	0	8	5	15	40	12	56	0	10
25	12	59	13	33	6	13	2	12	3	37	1	55	5	54	1	44	8	25	15	46	12	38	0	40
26	13	12	13	22	5	54	2	23	3	31	2	7	5	55	1	28	8	45	15	52	12	18	1	10
27	13	24	13	12	5	35	2	33	3	25	2	20	5	55	1	11	9	5	15	58	11	58	1	40
28	13	36	13	0	5	16	2	43	3	18	2	32	5	54	0	54	9	25	16	2	11	38	2	10
29	13	46			4	57	2	52	3	11	2	44	5	53	0	36	9	45	16	6	11	17	2	39
30	13	56			4	39	3	0	3	3	2	56	5	51	0	19	10	4	16	9	10	55	3	8
31	14	[illegible]			4	20			2	55			5	49	0 **	1			16	11			3	37

Equal time faſter as far as the two aſteriſks.

Equal time ſlower to the next aſteriſks.

Equal time faſter to the next aſteriſks.

Equal time ſlower as far as the next two aſteriſks.

Equal time faſter.

EQUATOR, in geography, a great circle of the terreſtrial globe, equidiſtant from its poles, and dividing it into two equal hemiſpheres; one north, and the other ſouth. See the article GLOBE.

It paſſes through the eaſt and weſt points of the horizon, and at the meridian is raiſed as much above the horizon as is the complement of the latitude of the place. From this circle, the latitude of places, whether north or ſouth, begin to be reckoned, in degrees of the meridian. See LATITUDE and MERIDIAN.

All people living on this circle, called by geographers and navigators, the line, have their days and nights conſtantly equal. See the article EQUINOCTIAL.

It is in degrees of the equator, that the longitude of places are reckoned; and as the natural day is meaſured by one revolution of the equator, it follows that one hour anſwers to $\frac{360}{24} = 15$ degrees: hence one degree of the equator will contain four minutes of time; fifteen minutes of a degree will make a minute of an hour; and conſequently, four ſeconds anſwer to one minute of a degree.

EQUERRY, in the britiſh cuſtoms, an officer of ſtate, under the maſter of the horſe.

There are five equerries, who ride abroad with his majeſty; for which purpoſe they give their attendance monthly, one at a time, and are allowed a table.

As to the equerries of the crown-ſtable, they have this diſtinct appellation, as being employed in mounting, managing, and breaking the ſaddle-horſes for his majeſty's uſe, and holding his ſtirrup.

EQUES AURATUS, is uſed for a knight batchelor, called *auratus*, q. d. *gilt*, becauſe antiently none but knights were allowed to beautify their armour, or other habiliments for war, with gold.

This term is not uſed in law, but inſtead of it *miles & chevalier* are made uſe of.

EQUESTRIAN STATUE, ſignifies the ſtatue of a perſon mounted on horſeback.

EQUESTRIAN ORDER, among the Romans, ſignified their knights, or equites; as alſo their troopers, or horſemen in the field; the firſt of which orders ſtood in contradiſtinction to the ſenators, as the laſt did to the foot, military or infantry: each of theſe diſtinctions was introduced into the ſtate by Romulus. See the articles KNIGHT and SENATOR.

EQUIANGULAR, in geometry, an epithet given to figures, whoſe angles are all equal: ſuch are a ſquare, an equilateral triangle, *&c.*

EQUICRURAL, in geometry, the ſame with iſoſceles. See the article ISOSCELES TRIANGLE.

EQUIDIFFERENT NUMBERS, in arithmetic, are of two kinds. 1. Continually equidifferent is when, in a ſeries of three numbers, there is the ſame difference between the firſt and ſecond, as there is between the ſecond and third; as 3, 6, 9. And, 2. Diſcretely equidifferent, is when in a ſeries of four numbers or quantities, there is the ſame difference between the firſt and ſecond as there is between the third and fourth: ſuch are 3, 6, 7, 10.

EQUIDISTANT, an appellation given to things placed at equal diſtance from ſome fixed point, or place, to which they are referred.

EQUILATERAL, in general, ſomething that hath equal ſides, as an equilateral angle.

EQUILATERAL HYPERBOLA, one whoſe tranſverſe diameter is equal to its parameter; and ſo all the other diameters, equal to their parameters: in ſuch an hyperbola, the aſymptotes always cut one another at right angles in the center. Its moſt ſimple equation, with regard to the tranſverſe axis, is $y^2 = x - a^2$; and, with regard to the conjugate, $y^2 = x^2 + a^2$, when a is the ſemitranſverſe, or ſemiconjugate. The length of the curve cannot be found by means of the quadrature of any ſpace, of which a conic ſection is any part of the perimeter. See the article HYPERBOLA.

EQUILIBRIUM, in mechanics, is when the two ends of a lever or balance hang ſo exactly even and level, that neither doth aſcend or deſcend, but keep in a poſition parallel to the horizon; which is occaſioned by their being both charged with an equal weight.

EQUIMULTIPLES, in arithmetic and geometry, are numbers and quantities multiplied by one and the ſame number or quantity. Hence, equimultiples are always in the ſame ratio to each other, as the ſimple quantities before multiplication: thus, if 6 and 8 are multiplied by 4, the equimultiples 24 and 32 will be to each other, as 6 to 8.

EQUINOCTIAL, in aſtronomy, a great circle of the celeſtial globe, whoſe poles are the poles of the world.

It is ſo called, becauſe whenever the ſun comes to this circle, the days and nights are equal all over the globe; being the ſame with that which the ſun ſeems to deſcribe, at the time of the two equinoxes of ſpring and autumn. See the article EQUINOX.

All ſtars, directly under this circle, have no declination, and always riſe due eaſt, and ſet full weſt. The hour circles are drawn at right angles to it, paſſing thro' every fifteenth degree; and the parallels to it are called parallels of declination. See the articles DECLINATION and CIRCLE.

EQUINOCTIAL	COLURE,	See	COLURES.
	DIAL,		DIAL.
	HOUR,		HOUR.
	LINE,		LINE.
	OCCIDENT,		OCCIDENT.
	ORIENT,		ORIENT.
	POINT, *&c.*		POINT, *&c.*

EQUINOX, the time when the ſun enters either of the equinoctial points, where the ecliptic interſects the equinoctial. See the preceding article.

It is ſo called, becauſe when the ſun is in theſe points, the days and nights are of an equal length all the world over. As the ſun is in one of them, in the ſpring, *viz.* March 20th, it is called the vernal equinox; and in the other, in autumn, *viz.* September 23d, it is called the autumnal equinox.

Preceſſion of the EQUINOXES. See the article PRECESSION.

EQUINUS BARBATUS, in aſtronomy, a kind of comet, called alſo hippeus. See the article HIPPEUS.

EQUIPOLLENCE, in logic, is when there is an equivalence, or agreement, either as to the nature of the thing, or as to the grammatical ſenſe of any two or more propoſitions; that is, when two propoſitions ſignify one and the ſame thing, though they expreſs it after different manners.

EQUISETUM, HORSE-TAIL, in botany, a genus of the cryptogamia claſs of plants, and order of filices, or ferns; the fructifications of which are diſpoſed on an oblong ſpike, and are of an orbicular figure, dividing in various angles from the baſe. The plant itſelf conſiſts of jointed ſtalks, in ſome ſimple, in others branched; producing ſetæ, or ſmaller diviſions, of the ſame ſtructure with the larger ones.

Horſe-tail is accounted vulnerary, and aſtringent, and therefore preſcribed in hæmorrhages, and injuries of the kidneys and bladder.

EQUITY, in a general ſenſe, the virtue of treating all other men according to common reaſon and juſtice, or as we would be gladly treated ourſelves, when we underſtand aright what is our due.

Equity is ſaid to be of two kinds, the one of which abridges, and takes from the letter of the law, whilſt the other enlarges, and adds thereto. The firſt is a correction of the law, generally made in that part wherein it fails, or is too ſevere, as where it is enacted that whoſoever commits ſuch a thing ſhall be deemed a felon, and ſuffer death: here, if a madman, or an infant, that has no diſcretion, commit the ſame, they ſhall not be deemed felons, nor ſuffer death for it; and where a perſon, to ſave his life, kills another that aſſaults him, tho' in general all killing is felony, this, by the law of reaſon, will be excuſed.

The other equity is defined to be an extenſion of the words of the law to caſes unexpreſſed, yet having the ſame reaſon: as for example, the ſtatute which ordains, that in an action of debt againſt executors, he that appears by diſtreſs ſhall anſwer; this, by equity, extends to adminiſtrators, for ſuch of them as appears firſt ſhall, by the equity of the ſaid act, anſwer, becauſe they are of the like kind and degree.

EQUITY *of redemption*, in our law, is applied to mortgages, as where money being due on a mortgage, the mortgagee is deſirous to bar the mortgager's equity of redemption, that is, his right to redeem the mortgage. In this caſe the mortgagee may oblige the mortgager, either to pay the money, or to be foreclosed of his equity of redemption. The practice is to exhibit a bill, to which anſwer being put in, and a decree obtained, a maſter of that court certifies what is due for principal, intereſt, and coſts, which is to be paid within the time limited by the decree, and thereupon the eſtate mortgaged is to be conveyed to the mortgager, otherwiſe for default of payment, the mortgager is decreed to be foreclosed from all equity of redemption, and abſolutely to convey the mortgaged premiſes to the mortgagee. See the article MORTGAGE.

EQUITY alſo frequently ſignifies the court of chancery, where controverſies are determined according to the exact rules of equity and conſcience, by mitigating the rigor of the common law; though even by the common and ſtatute law there is alſo an equity. See the article CHANCERY.

Equitas ſequitur legem, is an old maxim in law, but from the great increaſe of ſuits in chancery, ſome have thought fit to give it this conſtruction, that in all cauſes, after a man hath been at law, he muſt go to equity.

EQUIVALENT, an appellation given to things which agree in nature, or other circumſtances, as force, virtue, &c.

EQUIVOCAL TERMS, or WORDS, among logicians, are thoſe which have a doubtful, or double meaning.

According to Mr. Locke, the doubtfulneſs and uncertainty of words has its cauſe more in the ideas themſelves, than in any incapacity of the words to ſignify them; and might be avoided, would people always uſe the ſame term to denote the ſame idea, or collection of ideas: but, adds he, it is hard to find a diſcourſe on any ſubject where this is the caſe; a practice which can only be imputed to folly, or great diſhoneſty; ſince a man, in making up his accompts, might with as much fairneſs uſe the numeral characters ſometimes for one, ſometimes for another collection of units.

EQUIVOCAL ACTION is, where the effect is of a different kind from the cauſe producing it.

EQUIVOCAL CAUSE. See CAUSE.

EQUIVOCAL GENERATION, the production of animals, without the intercourſe between the ſexes, by the influence of the ſun or ſtars, *&c.*

The equivocal generation of plants, is their production without ſeed, in the ordinary courſe of nature. See the article GENERATION.

This kind of generation is now quite exploded by the learned. Mr. Ray is clearly of opinion, that there is no ſuch thing as ſpontaneous or equivocal generation; but that all animals are the iſſue of parents of the ſame ſpecies with themſelves; and with him agree Redi, Willoughby, and Liſter. This laſt author hath fully refuted the vulgar notion, that horſe-hairs, thrown into water, will become animated bodies; by ſhewing, that appearances of this kind are hair-worms bred in the bodies of other inſects, and particularly of the common black beetle.

EQUIVOCATION, in ethics, the crime of wilfully uſing equivocal terms. See the article EQUIVOCAL.

EQUULEUS, or ECUULEUS, in antiquity, a kind of rack uſed for extorting a confeſſion, at firſt chiefly practiſed on ſlaves, but afterwards made uſe of againſt the chriſtians.

The equuleus was made of wood, having holes at certain diſtances, with a ſcrew, by which the criminal was ſtretched to the third, ſometimes to the fourth, or fifth holes, his arms and legs being faſtened on the equuleus with cords; and thus was hoiſted aloft, and extended in ſuch a manner, that all his bones were diſlocated. In this ſtate red hot plates were applied to his body, and he was goaded in the ſides with an inſtrument called ungula.

EQUULEUS, in aſtronomy, a conſtellation of the northern hemiſphere, whoſe ſtars, according to Ptolemy, and Tycho's catalogues, are four, but in Mr. Flamſteed's ten.

EQUUS, the HORSE, in zoology. See the article HORSE.

ERANARCHA, a public officer among the antient Greeks, whoſe buſineſs was to preſide over, and direct, the alms and proviſions made for the poor. Cornelius Nepos, in his life of Epaminondas, deſcribes the office thus; when any perſon was reduced to poverty, taken captive, or had a daughter to marry, which he could not effect for want of money, *&c.* the eranarcha called an aſſembly of friends and neighbours, and taxed each according to his means and eſtate, to contribute towards his relief.

ERANTHEMUM, in botany, a genus of the diandria-monogynia claſs of plants, the calyx of which is a quinquefid, tubular, very narrow, erect, ſhort, acuminated and permanent perianthium, the corolla is funnel-ſhaped, the tube filiform, and the ſtigma ſingle.

ERASED, in heraldry, the ſame with arrache. See article ARRACHE'E.

It alſo denotes parts of animals torn, not cut off, from the part to which nature fixed them.

ERECT FLOWERS, ſuch as grow upright without hanging or reclining the head. See the article FLOWER.

ERECT DIAL. See the article DIAL.

ERECT-VISION. See VISION.

ERECTION, in a general ſenſe, the art of raiſing or elevating any thing, as the erection of a perpendicular, *&c.*

ERECTION is alſo uſed in a figurative ſenſe, as the erection of a biſhoprick, marquiſate, *&c.*

ERECTION is particularly uſed by medical writers, for the ſtate of the penis when ſwelled and diſtended by the action of the muſcles called erectores. See the articles PENIS and ERECTOR.

There is alſo an erection of the clitoris, which is performed by muſcles for that purpoſe, called alſo erectores. See the articles ERECTOR and CLITORIS.

De Graaf aſſigns two kinds of veſſels with its muſcles, for the performance of this office; the nerves, by which the animal ſpirits flow into its membranous parts, and render them more rigid and tumid, and the arteries carrying the blood to diſtend the corpora cavernoſa.

ERECTOR CLITORIS, in anatomy, one of the two muſcles of the clitoris that ſerve for its erection.

The erectores of the clitoris ariſe from the oſſa iſchii, and are inſerted into the corpora cavernoſa.

ERECTOR PENIS, one of the two muſcles of the penis, that ſerve for its erection. Theſe ariſe on each ſide from the oſſa iſchii between the tubercle of this bone and the beginning of the corpus cavernoſum, and each of them is inſerted into the corpus cavernoſum of its own ſide. Theſe muſcles when they act together, preſs the veins of the back of the penis againſt the oſſa pubis, by which they prevent the reflux of blood from the penis; and conſequently when at the ſame time the blood flows impetuouſly into the part by the arteries, and cannot get back this way, the penis becomes erected.

EREMIT, or HERMIT. See HERMIT.

EREMITA, the HERMIT, in zoology, a ſpecies of ſquill, with a long ſoft tail, and the right claw the larger. See the article SQUILL.

Authors call it cancellus, or the little crab, as being only two inches and a half in length.

ERETRIAN EARTH, in natural hiſtory, a kind of bole. See the article BOLE.

ERFURT, a large and beautiful city of Upper Saxony, in Germany, capital of Thuringia, and ſubject to the elector of Mentz: eaſt long. 11° 6′, north lat. 51°.

ERGOT, in farriery, is a ſtub, like a piece of ſoft horn, about the bigneſs of a cheſnut, placed behind and below the paſtern-joint, and commonly hid under the tuft of the ſet-lock.

To diſergot, or to take it out, is done by cleaving it to the quick, with an inciſion-knife, in order to pull up a bladder full of water, that lies covered with the ergot. This operation is ſcarce ever performed in France, but in Holland 'tis frequently performed upon all four legs, with intent to prevent watery ſores, and other foul ulcers.

ERICA, HEATH, in botany. See the article HEATH.

ERICHTHONIUS, in aſtronomy, a conſtellation more uſually called auriga. See the article AURIGA.

ERIDANUS, in aſtronomy, a conſtellation of the ſouthern hemiſphere; containing, according to different authors, 19, 30, or even 68 ſtars.

ERIE, a vaſt lake to the weſtward of Penſylvania, in North America, ſituated between 80° and 87° weſt long. and between 41° and 42° north lat.

ERIGERON, SWEET FLEABANE, in botany, a genus of the ſyngeneſia polygamia ſuperflua claſs of plants, the compound flower whereof is radiated; the partial hermaphrodite one infundibuliform; and the female flower is ligulated, linear, and ſubulated: The fruit has no pericarpium, the cup is connivent: the ſeeds of the hermaphrodite flower are oblong, ſmall, and crowned with long down. This plant is a diuretic, and promotes the menſes: the ſmell of it drives away flies, and kills lice and other like vermin.

ERINACEUS, in zoology, the name by which authors call the hedge-hog. See the article HEDGE-HOG.

ERINGO, in botany, the engliſh name of the eryngium. See ERYNGIUM.

ERINUS, in botany, a genus of the didynamia-angioſpermia claſs of plants; the corolla whereof conſiſts of a ſingle, unequal petal; the tube is ovato-cylindric, of the length of the cup, and reflected; and the limb is plane, and divided into five ſegments; the fruit conſiſts of bilocular capſules, ſurrounded by the cup; the ſeeds are numerous and ſmall.

ERIOCAULON, in botany, a genus of the triandria trigynia claſs of plants, the general corolla of which is uniform and convex; the partial flower conſiſts of three lanceolated, obtuſe, hairy petals, narrow at the baſe, where they all three unite into one ſtyliform hairy pedicle: the cup changes into a capſule, and contains a ſingle ſeed winged with down.

ERIOCEPHALUS, in botany, a genus of the ſyngeneſia polygamia neceſſaria claſs of plants, the compound flower of which is radiated; the proper hermaphrodite one is funnel-ſhaped; the female ones, being five in number, are ligulated in the radius: there is no pericarpium: the ſeed of the hermaphrodite produces no fruit; the ſeed of the female is ſingle, roundiſh, naked, and placed vertically.

ERIOPHORUM, in botany, a genus of the triandria monogynia claſs of plants, without any flower petals: the cup is a ſpike imbricated with oval, and oblong ſquamæ; the ſeed is a triquetrous and acuminated ſeed, furniſhed with hairs longer than the ſpike.

ERIVAN, a city of Perſia, on the frontiers of Turky, ſituated on the ſouth end of a lake of the ſame name: eaſt long. 45°, north lat. 40° 6′.

ERKELENS, a city of Weſtphalia, in Germany, ten miles north of Juliers: eaſt long. 6°, north lat. 51°.

ERMIN, *ermineum*, in zoology, a ſpecies of muſtela, with narrow ears, and of the ſize of the weaſel. See MUSTELA.

The whole body of the ermin is of a pure ſnow-white, except the tip of the tail, which is of a deep black, and ſome ſpots of a greyiſh yellow about the head and ſhoulders. Its fur is much valued. See the article FUR.

ERMIN, in heraldry, is always argent and ſable, that is, a white field, or fur, with black ſpots. Theſe ſpots are not of any determinate number, but may be more or leſs, at the pleaſure of the painter, as the ſkins are thought not to be naturally ſo ſpotted; but ſerving for lining the garments of great perſons, the furriers were wont, in order to add to their beauty, to ſow bits of the black tails of the creatures that produced them, upon the white of their ſkin, to render them the more conſpicuous, which alteration was introduced into armoury. See plate LXXXVIII. fig. 4.

ERMIN, or EARS OF CORN, an order of knights in France, inſtituted by Francis the laſt of that name, duke of Britany.

This order was ſo called on account that the collar of it was made up of ears of corn, lying athwart one another in ſaltier, bound together, both above and below, each ear being croſſed twice, the whole of gold. To this collar there hung a little white beaſt, called an ermin, running over a bank of graſs, diverſified with flowers.

ERMINE', or croſs erminé, is one compoſed of four ermin ſpots, placed as repreſented in plate LXXXVIII. fig. 5.

It is to be obſerved, that the colours in theſe arms, are not to be expreſſed, becauſe neither this croſs nor theſe arms can be of any other colour but white and black.

ERMINES are, by ſome engliſh writers, held to be the reverſe of erminé, that is, white ſpots on a black field, and yet the French uſe no ſuch word, but call this black powdered with white *contre ermin*, which is very proper, as it denotes the reverſe of ermin. See the article ERMIN.

ERMINITES ſhould ſignify little ermines, but it is otherwiſe; for it expreſſes a white field powdered with black, only that every ſuch ſpot hath a little red hair on each.

Erminites alſo ſignify a yellow field powdered with black, which the French expreſs much better by *or ſemée d'ermine de ſable*.

EROSION, among phyſicians, denotes much the ſame with corroſion, only in a ſtronger degree. See the articles CORROSION and CORROSIVES.

EROTIC, in general, any thing relating to the paſſion love.

Phyſicians take notice of the erotic delirium, or that melancholy occaſioned by exceſſive love.

ERPACH, a city of Franconia, in Germany, capital of a county of the ſame name, and ſituated thirty miles ſouth eaſt of Francfort: eaſt long. 8° 50', north lat. 49° 42'.

ERQUIKO, a port town of the Red-ſea, on the coaſt of Abex in Africa: eaſt long. 39°, north lat. 17°.

ERRANT, or ITINERANT, is a title that is applied to juſtices that go the circuits, and alſo to bailiffs at large.

ERRATA, a liſt of the errors or faults in the impreſſion of a book, generally placed at the beginning thereof.

ERRATIC, in general, ſomething that wanders, or is not regular: hence it is, the planets are called erratic ſtars; as thoſe fevers, which obſerve no regular periods, are denominated erratic fevers.

ERRHINES, ἐῤῥινα, in pharmacy, medicines which, when ſnuffed up the noſe, promote a diſcharge of mucus from that part.

The excretion of the mucous lymph is excellently promoted by errhines and ſternutatories, the former of which ſtimulate the pituitary coats but gently, whereas the latter more forcibly ſtimulate them, to an excretory motion. See the article STERNUTATORY.

Among the milder kind of the errhines, we may reckon marjoram, baſilicon, thyme, hyſſop, ſavory, marum ſyriacum, the tops of origanum, flowers of lilies of the valley, and benjamin, the reſin of guaiacum, fine raſpings of aloes wood, dry volatile ſalt of ſal-ammoniac perfumed with oil of marjoram, as alſo white vitriol. On the contrary, violent errhines are euphorbium, the powder of white hellebore, and, in a milder degree, ſeveral ſorts of ſnuffs, precipitate mercury, and pepper.

Errhines are more friendly to the conſtitution and nerves than ſternutatories, by their ſubtile, acrid, and volatile ſalt, gently ſtimulating the pituitary membrane, and drawing the mucid humour from it. They are alſo much ſafer than ſternutatories, in their effects.

Errhines prepared of cephalic herbs are of ſingular ſervice in oppreſſive pains of the head, a hemicrania, lethargic diſorders, weakneſſes of memory, ſtuffings of the head, and coryza, mucous defluxions of the eyes, drowſineſs, vertigoes, and in caſes where the malignant humours, generated by the lues venerea, are lodged in the membranes of the noſtrils.

ERROUR, or ERROR, in philoſophy, a miſtake of our judgment, giving aſſent to that which is not true.

Mr. Locke reduces the cauſe of error to theſe four, firſt, want of proofs; ſecondly, want of ability to uſe them; thirdly, want of will to uſe them; and, fourthly, wrong meaſures of probability.

That great writer obſerves upon the firſt of theſe cauſes of error, that the greateſt part of mankind want conveniencies and opportunities of making experiments and obſervations themſelves, or of collecting the teſtimonies of others, being prevented by the neceſſity of their condition. Upon the ſecond of theſe cauſes he obſerves, that there are many who from the ſtate of their condition, might beſtow time in collecting proofs, but yet are not able to carry a train of conſequences in their heads, nor weigh exactly the preponderancy of contrary proofs and teſtimonies, merely from the difference in mens underſtandings, apprehenſions, and reaſonings. Thirdly, he remarks, that though ſome have opportunities and leiſure enough, and want neither parts, learning, nor other helps, that they never come to the knowlege of ſeveral truths within their reach, either upon the account of their attachment to pleaſure or buſineſs; and otherwiſe becauſe of their lazineſs or averſion to ſtudy. The fourth cauſe of error, *viz.* wrong meaſures of probability, he imputes, 1. To the practice of taking for principles propoſitions that are not in themſelves certain and evident, but, on the contrary, doubtful and falſe. 2. To received hypotheſes. 3. Predominant paſſions or inclinations. And, 4. To authority, or the giving up our aſſent to the common received opinions either of our friends or party, neighbours or country.

The cauſes of errors in philoſophy, or the reaſons why all former philoſophers have through ſo many ages erred, according to lord Bacon, are theſe following. 1. Want of times ſuited to learning. 2. The little labour beſtowed upon natural philoſophy. 3. Few entirely addicted to natural philoſophy. 4. The end of the ſciences wrong fixed. 5. A wrong way choſen. 6. The neglect of experiments. 7. Regard to antiquity and authority. 8. Admiration of the works in uſe. 9. The artifice of teachers and writers in the ſciences. 10. Oſtentatious promiſes of the moderns. 11. Want of propoſing worthy taſks. 12 Superſtition and zeal being oppoſite to natural philoſophy, as thinking philoſophy dangerous, on account of the ſchool-theology; from the opinion that deep natural enquiries ſhould ſubvert religion. 13. Schools and academies proving unfavourable to philoſophy. 14. Want of rewards. And, 15. Deſpair and the ſuppoſition of impoſſibility.

ERROR, in law, is a fault committed in pleading, or in a proceſs, whereupon a writ of error is brought to remedy this overſight; and a writ of this kind alſo lies to redreſs falſe judgments, given in any court of record. There is likewiſe a writ of error to reverſe a fine or recoveries.

ERUCA, the CATERPILLAR, in zoology. See the article CATERPILLAR.

ERUCA, the WHITE-ROCKET, in botany, a ſpecies of braſſica, with lyrate leaves, hairy ſtalks, and ſmooth pods. See the article BRASSICA.

ERUCTATIONS, in medicine, are the effect of flatulent foods, and the crudities thence ariſing. See FLATULENCY.

ERUDITION, *eruditio*, denotes an extenſive acquaintance with books, eſpecially ſuch as treat of the belles lettres.

ERUPTION, in medicine, a ſudden and copious excretion of humours, as pus or blood: it ſignifies alſo the ſame with exanthema, any breaking out, as the puſtules of the plague, ſmall-pox, meaſles, &c. See the article EXANTHEMA, &c.

The peſtilent eruptions are ſpots of a purple or red colour; or they are black, or of a violet colour: commonly they are of a round figure, ſometimes broad, or of an oblong or ſome other ſhape: they ſhew themſelves in the ſkin up and down the body. See the articles PLAGUE, BUBOE, CARBUNCLE, &c.

Spots of a purple, black, greeniſh, or violet colour, at whatever time they appear, are always fatal ſigns.

Scabby **ERUPTIONS** in the heads of children. See the articles CRUSTA LACTEA, and ACHOR.

The heads of children are often troubled with ſcabby eruptions: theſe are expelled by the benefit of nature; and before the eruption, the child is often troubled with epileptic fits from the irritation of the morbific matter. If the humour ſtrike in, either ſpontaneouſly, or by improper applications; or if the exanthemata are of a blackiſh colour, they are very dangerous, and the child generally falls into an aſthma, or a fatal epilepſy.

Harris preſcribes the teſtaceous powders for infants in this caſe. Heiſter, if the child is ſuſpected of the venereal diſeaſe, would have a grain or two of mercurius dulcis added with gentle purges between whiles, eſpecially if the body is not looſe. Externally, nothing of ſulphur or mercury ſhould be applied, or repellent lotions, or any cold thing. To mollify the ſcabs, freſh butter or calves marrow, or cream, is ſufficient. This caſe often proves obſtinate, and then the nurſe ſhould obſerve a ſtrict regimen, uſe a good diet, take ſweetners of the blood, and purgatives now and then.

ERVUM, BITTER VETCH, a genus of the diadelphia-decandria claſs of plants, the corolla of which is papilionaceous; the vexillum plane, ſlightly turned up, and of a roundiſh form; the alæ are obtuſe, and ſhorter by half than the vexillum; the carina is acuminated, and ſhorter than the alæ: the fruit is a thick, knotty, obtuſe and oblong pod, with protuberant ſeeds, which are four in number, and of a roundiſh figure. This plant, abounding with diuretic ſalt, is recommended for the ſtone.

ERYNGIUM, ERINGO, in botany, a genus of the pentandria-digynia claſs of plants, the general corolla of which is uniform and roundiſh; the partial one conſiſts of five oblong petals, knotted together by a longitudinal line. The fruit is of an oval figure, and diviſible in two parts: the ſeeds are oblong and roundiſh. The root of eryngium is attenuant and deobſtruent, and is therefore eſteemed a good hepatic, uterine, and nephritic. Its whole virtue conſiſts in the external or cortical part.

ERYSIMUM, HEDGE-MUSTARD, in botany, a genus of the tetradynamia-siliquoſa claſs of plants, the corolla whereof conſiſts of four oblong, cruciform petals, with a very obtuſe point: the fruit is a long, linear, four-cornered pod, conſiſting of two valves, and divided into two cells: the ſeeds are numerous, ſmall, and roundiſh.

This plant is recommended in paralytic and epileptic caſes; it expels poiſon, deſtroys worms, ſtrengthens the ſtomach, and cures ulcers of the mouth.

ERYSIPELAS, in medicine, an eruption of a fiery or acrid humour, from which no part of the body is exempted, though it chiefly attacks the face.

As to the material cauſe of an eryſipelas, it ſeems to be of a cauſtic, acrid, and putrifying nature; perhaps corrupted bile, which, being conveyed into the maſs of blood, indiſpoſes the whole nervous and vaſcular ſyſtems, and excites a fever, till it is at laſt driven out to the ſurface of the body. Perſons of a ſanguine habit, young people, and pregnant women, are moſt ſubject to it; and all hot things, violent paſſions, and whatever occaſions other inflammations, likewiſe give riſe to this. See the article INFLAMMATION.

The patient is taken ſuddenly, whilſt he is in the open air, with chilneſs, a ſhivering, and other ſymptoms common in a fever: the part affected ſwells a little with great pain, and intenſe redneſs, and is beſet with a vaſt number of ſmall puſtles, which, when the inflammation is increaſed, are converted into ſmall bliſters. The malady gradually creeps further and further, ſpreads itſelf from place to place, and is attended with a fever. See the article FEVER.

There is another ſort, though it ſeldom happens, commonly ariſing from a ſurfeit, or a debauch of drinking ſpirituous liquors. A ſmall fever which precedes it, is followed preſently by an eruption of puſtles, almoſt all over the body, which look like the ſtings of nettles, and ſometimes riſe up into bladders: preſently they go away again, with an itching ſcarce tolerable; but as often as they are ſcratched they appear again.

This diſtemper has a great affinity with a peſtilential fever, as it is attended with moſt of the ſymptoms in that caſe: but this is to be underſtood of the worſt kind of eryſipelas. On the third and fourth day, the malignant matter is thrown out on the ſurface of the body, and then the ſymptoms a little abate. There is often a pain, redneſs, and tumour in the inguinal glands, from whence the matter, of a hot, fiery quality, deſcends to the feet. If the head is attacked, the parotid glands are affected; if the breaſt, the axillary. The mammary and axillary glands are not ſeldom ulcerated, and affect the joints with a virulent corruption; and likewiſe, as in the plague, there is nothing more dangerous than the expelled matter to return back from the ſurface of the body to the inward parts. In ſome, eſpecially young perſons, the matter is not ſo violent, nor the fever ſo great: the glands remain unaffected, and the eruption happens on the ſecond day. This is not at all dangerous. In children, the umbilical region generally ſuffers, with a fatal event. In a day or two the tumor ſubſides, the heat and pain ceaſe, the roſy colour turns yellow, the cuticle breaks, and falls off in ſcales, the danger is over. When the eryſipelas is large, deep, and falls upon a part of exquiſite ſenſe, the patient is not very ſafe; but if the red colour changes into black and blue, it will end in a mortification. If the inflammation cannot be diſcuſſed, it will ſuppurate, and bring on fiſtulas and a gangrene: when the patient is cacochymical, the leg will ſometimes ſwell three times as big as the natural ſize, and is cured with great difficulty. Thoſe who die of this diſeaſe, die of the fever, which is generally attended with difficulty of breathing, ſometimes a delirium, ſometimes with ſleepineſs; and this in ſeven days time.

Let the patient's diet be water-gruel or barley-broth, with roaſted apples. If he drinks any beer, let it be very ſmall, and let him keep out of bed ſome hours in a day. The medicinal writers do not agree in their opinions, concerning purging in the cure of the eryſipelas; but what they deliver upon this ſubject, is full of doubtings and uncertainties, and that at a point of time when the diſtemper is moſt dangerous and threatning: however it is the general opinion in this caſe, that it is a right practice, more eſpecially if the head is affected with an eryſipelas, and there comes upon it a coma, a delirium, or convulſions, wherein the brain is evidently attacked; then purging is the only indication that can afford any hopes of recovering the patient: nor in theſe difficulties ſhould the matter be delayed till the fever is abated, or the humour ſubſided. Therefore, the beſt practice appears to be that of taking away nine or ten ounces of blood, and the next morning giving the patient the common purging potion.

It wll be ſafeſt to avoid external applications, unleſs a powder made of elder-flowers and liquorice ſprinkled on the part; or lime-water mixt with a fourth part of ſpirit of wine and camphor, dipping a linen cloth in it ſeveral times doubled, and applying it hot to the part. An infuſion of ſcordium, elder-flowers, and fennel-ſeed, drank in the manner of tea is uſeful to expel the morbific matter. If the diſeaſe does not yield to the firſt bleeding, let it be repeated. If that will not do, let it be reiterated twice more, one day being interpoſed between. On the days free from bleeding, preſcribe a clyſter of milk, and ſyrup of violets; alſo the cooling emulſion and julep.

Turner commends much a mixture of ol. ſambucin. and aqua calcis, with ſome ſpirit of wine camphorated. A cataplaſm of cow's dung is very good to eaſe the pain.

In a ſymptomatic eryſipelas, the following liniment is good: ℞ Ol. ſambucin. lixiv. tenueor. ana p. æ. m. let them be ſhaked well in a phial till they unite in an ointment.

In a ſcorbutic eryſipelas, beſides externals, ſudorifics are to be given; as Rob. ſambucin. ſpi. ſambuci bezoar. min. ſp. ſal. armon. cochlear, &c.

ERYTHRINA, CORAL-TREE, in botany, a genus of the diadelphia-decandria claſs of plants, the corolla of which is papilionaceous, and conſiſts of four petals: the fruit is a very long pod, protuberated by the ſeeds, terminating in a ſmall point, and conſiſting of one cell; the ſeeds are kidney-ſhaped.

ERYTHRINUS, in ichthyology, a ſpecies of ſparus, of a ſtrong and elegant red colour, and the iris of the eyes of a fine ſilver-white; its tail is very much forked. See the article SPARUS.

ERYTHROCYANEUS, the red and blue maccaw, with a wedge-like tail, and the ſides of the head naked and rugoſe.

This bird is undoubtedly, ſays Mr. Edwards, the firſt of the parrot-kind; being a full yard long, from the point of the bill to the end of the tail, and its plumage adorned with the moſt beautiful variety of colours. Its head, neck, breaſt, belly, thighs, upper part of the back, and leſſer covert feathers of the wings, are of a very fine bright red, or ſcarlet-colour. The quill-feathers of the wings are of a very fine blue on their outſides, and a faint red on their under ſides; the next feathers above them are of a fine yellow colour, ſome of them being tipped with green, as are the blue quills next the back; the lower belly and under ſide of the tail, are of a beautiful blue, as are the ſhort ones on its upper ſide; and its long feathers are red tipped with blue. See plate XCIII. fig. 1.

ERYTHROIDES, in anatomy, the firſt of the proper tunics or coats which cover the teſticles. See TESTICLE.

ERYTHRONIUM, DOG'S TOOTH-VIOLET, in botany, a genus of plants belonging to the hexandria-monogynia claſs: the flower conſiſts of ſix oblong and lanceolated petals; and the fruit is a ſubgloboſe capſule, with three cells, in which are contained numerous ovato-acuminated ſeeds.

The root of this plant is recommended againſt the colic, epilepſy, and worms; it is alſo reckoned a provocative to venery.

ERYTHROPHTHALMUS, the SARFE, or RED EYE, in ichthyology, a ſpecies of cyprinus, with the iris of the eye, all the fins, and tail red. See CYPRINUS.

It ſomewhat reſembles the roach, and is only ten inches in length.

ERZERUM, the capital of the province of Turcomania, or Armenia; eaſt long. 41°, north lat. 40°.

It is a great thoroughfare from Perſia and India to Conſtantinople, by the way of Trebiſond and the Black-ſea.

ESCALADE, or SCALADE, in the art of war. See the article SCALADE.

ESCAMBIO, or EXCAMBIO, the ſame with exchange. See EXCHANGE.

ESCAPE, in law, a violent or privy evaſion out of ſome lawful reſtraint, without being delivered by due courſe of law. There are two ſorts of eſcapes, voluntary and negligent. Voluntary, when a man arreſts another for felony, or other crime, and afterwards lets him go freely by conſent; in which caſe, the party that permits ſuch eſcape, is held guilty, committed, and muſt anſwer for it. Negligent eſcape, on the contrary, is where one is arreſted, and afterwards eſcapes againſt the will of the perſon that arreſted him, and is not purſued with freſh ſuit, and re-taken before the perſon purſuing hath loſt ſight of him. By ſtat. 8 & 9 Will. III. c. 26. the keepers of priſons, conniving at eſcapes, ſhall forfeit 500 l. and, in civil caſes, the ſheriff is anſwerable for the debt.

ESCAPE-WARRANT, a proceſs which iſſues out againſt a perſon, committed in the king's bench or fleet priſons, that, without being duly diſcharged, takes upon him to go at large.

Upon this warrant, which is obtained on oath, a perſon may be apprehended on a Sunday.

ESCHALOT, *cepa aſcalonica*, a ſpecies of onion cultivated in gardens, for its uſe in cookery. See the article CEPA.

ESCHAR, in ſurgery, the cruſt or ſcab occaſioned by burns or cauſtic medicines. See the articles BURN and CAUSTIC.

ESCHARA, in botany, a genus of ſea-plants, compoſed of a gritty matter, but not very hard, of a reticulate texture, and ſometimes diſpoſed in the form of leaves, perforated with numerous roundiſh holes: theſe are ſo equally diſtributed, as to give the whole the appearance of a net. See plate XCIII. fig. 2.

There are ſeveral ſpecies of eſchara, diſtinguiſhed from the fucuſes, no leſs by their brittleneſs, than by their net like texture. See the article FUCUS.

ESCHAROTICS, in pharmacy, medicines which produce eſchars. See ESCHAR.

ESCHEAT, in law, ſignifies any lands or tenements that uſually fall to a lord within his manor, by way of forfeiture, or by the death of his tenant, without any heirs general or ſpecial.

The word eſcheat is ſometimes uſed for the place or circuit within which the king or other lord is entitled to eſcheats; alſo for a writ, to recover the ſame from the perſon in poſſeſſion after the tenant's death.

ESCHEATOR, in our old cuſtoms, an officer formerly appointed in every county, to make inqueſts of eſcheats due to the king; but ſince aboliſhing the court of wards, has been laid aſide as uſeleſs.

ESCHEVIN, or ECHEVIN. See ECHEVIN.

ESCHRAKITES, in matters of religion, a ſect of mahometans, who believe that man's ſovereign good conſiſts in the contemplation of God. They avoid all manner of vice, and appear always in good humour, deſpiſing the ſenſual paradiſe of Mahomet. The moſt able preachers, in the royal moſques, are of this ſect.

ESCLAIRCISSEMENT, a french term adopted into our language, ſignifying the explication or clearing up of ſome difficulty or obſcurity.

ESCLATTE', in heraldry, ſignifies a thing forcibly broken, or rather a ſhield that has been broken and ſhattered with the ſtroke of a battle-ax.

ESCORT, in the art of war, the ſame with convoy. See the article CONVOY.

ESCROW, among lawyers, a deed delivered to a third perſon, to be the deed of the party making it upon a future condition, that when a certain thing is performed, it ſhall be delivered to the party to whom it was made, to take effect as the deed of the perſon firſt delivering it.

ESCUAGE, in our old cuſtoms, a kind of knight-ſervice, called ſervice of the ſhield, by which the tenant was bound to follow his lord to the wars at his own charge.

It is alſo uſed for a ſum of money paid to the lord, in lieu of ſuch ſervice; or even for a reaſonable aid, levied by the lord upon his tenants who held by the knight's ſervice.

ESCULENT, an appellation given to ſuch plants, or the roots of them, as may be eaten; ſuch are beets, carrots, artichoaks, leeks, onions, parſneps, potatoes, radiſhes, ſcorzonera, *&c.* See the articles BEET, CARROT, *&c.*

ESCULUS, the HORSE CHESNUT, a genus of trees, belonging to the heptandria-monogynia claſs of plants; its flower conſiſts of five roundiſh petals, and the fruit is a roundiſh, echinated, and coriaceous capſule, with only one cell, in which are contained two roundiſh ſeeds, tho' ſometimes only one.

ESCURIAL, a palace of the king of Spain, twenty-one miles north-weſt of Madrid; being one of the largeſt and moſt beautiful in the world. It has eleven thouſand windows, fourteen thouſand doors, one thouſand eight hundred pillars, ſeventeen cloyſters or piazzas, and twenty-two courts; with every convenience and ornament that can render a place agreeable in ſo hot a climate, as an extenſive park, groves, fountains, caſcades, grottos, *&c.*

ESCUTCHEON, or SCUTCHEON, in heraldry, is derived from the french *eſcuſſon*, and that from the latin *ſcutum*, and ſignifies the ſhield whereon coats of arms are repreſented.

Moſt nations, of the remoteſt antiquity, were wont to have their ſhields diſtinguiſhed by certain marks painted on them; and to have ſuch on their ſhields was a token of honour, none being permitted to have them till they had performed ſome honourable action.

The eſcutcheon, as uſed at preſent, is ſquare, only rounded off at the bottom.

As to the bearings on ſhields, they might at firſt be arbitrary, according to the fancy of the bearer; but, in proceſs of time, they came to be the gift of kings and generals, as the reward of honourable actions.

Escutcheon *of pretence*, that on which a man carries his wife's coat of arms; being an heireſs, and having iſſue by her. It is placed over the coat of the huſband, who thereby ſhews forth his pretenſions to her lands. See the article Heiress.

Points of an **Escutcheon**. See Point.

Quartering of an **Escutcheon**. See the the article Quartering.

ESDRAS, the name of two apocryphal books, uſually bound up with the ſcriptures. They were always excluded the jewiſh canon, and are too abſurd to be admitted as canonical by the papiſts themſelves. The firſt book is chiefly hiſtorical, giving an account of the return of the Jews from the babyloniſh captivity, and the building of the ſecond temple; the ſecond is written in the prophetical way, pretending to viſions and revelations, but ſuch as are extremely ridiculous.

ESK, a river which forms part of the boundary between England and Scotland; and, running from north eaſt to ſouth-weſt, falls into the Solway-frith: it gives name to the country of Eſkdale.

ESKIMAUX, ſometimes called New Britain, and Terra de Labrador, is an extenſive country of North America, ſituated between 59° and 80° weſt long. and between 50° and 64° north lat.

It is bounded by Hudſon's ſtraits, which ſeparate it from Greenland, on the north; by the Atlantic ocean, on the eaſt; by the river and bay of St. Lawrence, on the ſouth-eaſt; and by Hudſon's bay, on the weſt.

ESLINGEN, an imperial city of Swabia, in Germany, ſeven miles ſouth-eaſt of Stutgard.

ESLIRASS, in law, perſons particularly appointed or choſen to impannel juries.

ESNECY, in law, a private prerogative, allowed to the eldeſt coparcener, where an eſtate is deſcended to daughters for want of an heir male, to chooſe firſt, after the eſtate of inheritance is divided.

It has been alſo extended to the eldeſt ſon and his iſſue, holding firſt, this right being *jus primogenituræ.*

ESOX, in ichthyology, a genus of malacopterygious fiſhes, wherein the membrane of the gills contains from twelve to fourteen oſſicles or little bones, and there is a fin on the back very near the tail.

To this genus belong the lucius or pike, the acus or needle-fiſh; and the greateſt ſquamoſe acus. See Lucius and Acus.

ESPALIERS, in gardening, are rows of trees planted about a whole garden or plantation, or in hedges, ſo as to incloſe quarters or ſeparate parts of a garden; and are trained up regularly to a lattice of wood-work in a cloſe hedge, for the defence of tender plants againſt the injuries of wind and weather. They are of admirable uſe and beauty in a kitchen-garden, ſerving not only to ſhelter the tender plants, but ſcreen them from the ſight of perſons in the walks.

The trees chiefly planted for eſpaliers, are apples, pears, and ſome plums: ſome plant apples grafted upon paradiſe-ſtocks; but, as theſe are of ſhort duration, it is better to plant thoſe grafted upon crab-ſtocks, or upon what the gardeners call dutch-ſtocks; which will both cauſe them to bear ſooner, and prevent their growing too luxuriant. The beſt kind of apples for this purpoſe, are the golden pippen, nonpareil, rennete, *&c.* and the beſt ſort of pear, are the jargonelle, blanquette, *&c.* Theſe laſt, if deſigned for a ſtrong moiſt ſoil, ſhould be grafted upon quince-ſtocks; but, if for a dry ſoil, upon free-ſtocks.

While the trees are young, it will be ſufficient to drive a few ſtakes into the ground on each ſide of them; faſtening the branches to theſe in an horizontal poſition, as they are produced. This method will do for the three firſt years; after which an eſpalier ſhould be made of aſh-poles, whereof there muſt be two ſorts, larger and ſmaller; the former to be driven upright into the ground a foot aſunder, and the latter, or ſlender poles, to be nailed acroſs theſe, at about nine inches. Some prefer to this another ſort of eſpalier, made of ſquare timber cut to any ſize; theſe are, indeed, more ſightly, but withal vaſtly more expenſive.

When the eſpalier is thus framed, the branches are to be faſtened to it with oſier-twigs; obſerving to train them in an horizontal poſition, and at equal diſtances. Fruit trees thus managed, are preferable to any others; not only as bearing better taſted fruit, but as taking up very little room in a garden, ſo as to be leſs hurtful to plants which grow in the quarters.

ESPAULE and **Espaulement**. See the articles Epaule and Epaulement.

ESPERIE, a city of Hungary, forty miles north of Tockay; it is remarkable for its ſalt mines.

ESPLANADE, in fortification, the ſloping of the parapet of the covered way towards the campaign. See Parapet and Campaign.

It is the ſame with glacis, but begins to be antiquated, and is more properly the empty ſpace betwixt a citadel and the houſes of a town, commonly called a place of arms. See Fortification, Covert-way, Glacis, and Citadel.

ESPLEES, in law, the general products which lands yield, or the profit or commodity that is to be taken or made of a thing; as of a common, the taking of graſs by the mouths of the beaſts that common there; of an advowſon, taking of tythes by the parſon; of wood, the ſelling of wood; of an orchard, ſelling the fruit growing there; of a mill, the taking of toll, *&c.*

Theſe and ſuch-like iſſues are termed eſplees. In a writ of right of land, advowſon, *&c.* the demandant muſt allege in his count, that he or his anceſtors took the eſplees of the thing demanded, otherwiſe the pleading is not good.

ESPOUSALS, in law, ſignify a contract or promiſe made between a man and a woman, to marry each other; and in caſes where marriage may be conſummated, eſpouſals go before. Marriage is termed an eſpouſal *de præſenti*.

ESQUINANCY, in medicine. See the article Quinzy.

ESQUIRE, *armiger*, was antiently the perſon that attended a knight in the time of war, and carried his ſhield.

This title has not, for a long time, had any relation to the office of the perſon, as to carry arms, *&c.* Thoſe to whom the title of eſquire is now of right due, are all noblemens younger ſons, and the eldeſt ſons of ſuch younger ſons; the eldeſt ſons of knights, and their eldeſt ſons; the officers of the king's courts, and of his houſhold; counſellors at law, juſtices of the peace, *&c.* though thoſe latter are only eſquires in reputation: beſides, a juſtice of the peace holds this title no longer than he is in commiſſion, in caſe he is not otherwiſe qualified to bear it; but a ſheriff of a county, who is a ſuperior officer, retains the title of eſquire during life, in conſequence of the truſt once repoſed in him; the heads of ſome antient families are ſaid to be eſquires by preſcription.

Esquires *of the king*, are ſuch as have that title by creation, wherein there is ſome formality uſed, as the putting about their necks a collar of SS, and beſtowing on them a pair of ſilver-ſpurs, *&c.*

There are four eſquires of the body to attend the king's perſon.

If an eſquire be arraigned of high treaſon, he ought to be tried by a jury each whereof have 40 s. of freehold, and 100 l. in goods; and a knight has no other privilege. The heir-apparent of an eſquire, is privileged to keep grey-hounds, ſetting-dogs, or nets to take partridges and pheaſants, though he cannot diſpend 10 l. of eſtate of inheritance, or the value of 30 l. of eſtate for life.

ESSART, or Assart, in law. See the article Assart.

ESSAY, a trial or experiment for proving the quality of any thing; or an attempt to learn, whether or no any invention will ſucceed.

Essay, in metalurgy. See Assay.

Essay, in literature, a peculiar kind of compoſition, the character whereof is to be free, eaſy, and natural; not tied to ſtrict order or method, nor worked up and finiſhed like a formal ſyſtem.

An eſſay chiefly conſiſts in occaſional reflections, leaving the ſubject and then returning to it again, as the thoughts happen to occur to the mind. Montaign is ſaid to have excelled in this ſpecies of writing; and the great lord Bacon is alſo a pattern a pattern in this way. Mr. Locke calls his treatiſe on the human underſtanding, an Eſſay; and Mr. Pope calls his four ethic epiſtles, an Eſſay on Man.

ESSAY-HATCH is the miner's term for a little trench or hole, which they dig to ſearch for ſhoad or ore.

ESSE, in the ſchools, the ſame with eſſence. See the article ESSENCE.

ESSECK, a town of Hungary, near the confluence of the rivers Drave and Danube, with a bridge five miles over; it lies about eighty miles north-weſt of Belgrade.

ESSENCE, in philoſophy, that which conſtitutes the particular nature of each genus or kind, and diſtinguiſhes it from all others; being nothing but that abſtract idea to which this name is affixed; ſo that every thing contained in it, is eſſential to that particular kind.

This Mr. Locke calls the nominal eſſence, in contradiſtinction to the real eſſence, or conſtitution of ſubſtances, on which this nominal eſſence depends; thus the nominal eſſence of gold, is that complex idea the word gold ſtands for; let it be, for inſtance, a body, yellow, weighty, malleable, fuſible, and fixed; but its real eſſence is the conſtitution of its inſenſible parts, on which thoſe qualities and all its other properties depend, which is wholly unknown to us.

That eſſence, in the ordinary uſe of the word, relates to ſorts, appears from hence, that, if you take away the abſtract ideas by which we ſort individuals, and rank them under common names, then the thought of any thing eſſential to any of them inſtantly vaniſhes. We have no notion of the one without the other, which plainly ſhews their relation. No property is thought eſſential to any individual whatſoever, till the mind refers it to ſome ſort or ſpecies of things; and then preſently, according to the abſtract idea of that ſort, ſomething is found eſſential; ſo that eſſential, or not eſſential, relates only to our abſtract ideas, and the names annexed to them.

Subſtances are diſtinguiſhed into ſorts and ſpecies, by their nominal eſſence; and the ſpecies of things are nothing to us, but the ranking them under diſtinct names, according to the complex ideas in us, and not according to preciſe diſtinct real eſſences in them.

We cannot rank and ſort things by their real eſſences, becauſe we know them not. Our faculties carry us no farther in the knowledge of ſubſtances, than a collection of thoſe ſenſible ideas we obſerve in them. But the internal conſtitution whereon theſe eſſences depend, is utterly unknown to us. This is evident when we come to examine but the ſtones we tread on, or the iron we daily handle; we ſoon find that we know not their make, and can give no reaſon of the different qualities we find in them; and yet how infinitely theſe come ſhort of the fine contrivance, and unconceivable real eſſences of plants and animals, every one knows.

But though the nominal eſſences of ſubſtances are made by the mind, they are not yet made ſo arbitrarily as thoſe of mixed modes. To the making of any nominal eſſence, it is neceſſary, 1. That the ideas whereof it conſiſts, have ſuch an union as to make but one idea, how compounded ſoever. 2. That the particular idea ſo united be exactly the ſame, neither more nor leſs: for if two abſtract complex ideas differ, either in number or ſorts of their component parts, they make two different, and not one and the ſame eſſence. In the firſt of theſe, the mind, in making its complex ideas of ſubſtances, only follows nature, and puts none together which are not ſuppoſed to have an union in nature; for men obſerving certain qualities always joined and exiſting together, therein copy nature, and of ideas ſo united make their complex ones of ſubſtances.

Though the nominal eſſences of ſubſtances are all ſuppoſed to be copied from nature, yet they are all, or moſt of them, very imperfect: and ſince the compoſition of theſe complex ideas is in ſeveral men very different, we may conclude that theſe boundaries of ſpecies are in men and not as nature makes them; if, at leaſt, there are in nature any ſuch prefixed bounds. If the firſt ſorting of individuals depends upon the mind of man, variouſly collecting the ſimple ideas that make the nominal eſſence of the loweſt ſpecies, it is much more evident that the more comprehenſive claſſes called genera, do ſo in forming more general ideas that may comprehend different ſorts: the mind leaves out thoſe qualities that diſtinguiſh them, and puts into its new collection only ſuch ideas as are common to ſeveral ſorts: thus by leaving out thoſe qualities that are peculiar to gold, ſilver, *&c.* and by retaining a complex idea made up of thoſe that are common to each ſpecies, there is a new genus conſtituted, to which the name metal is annexed.

ESSENCE, in chemiſtry, ſignifies the balſamic part of any thing, ſeparated from the thicker matter; ſo that wherever this is done by means of extraction, the balſamic part is called eſſence by way of eminence: ſometimes thickened juices are called eſſences, but it is better to call theſe by their own name, to avoid confuſion.

ESSENDO QUIETEM DE TOLLONIO, in law, a writ which lies for citizens, burgeſſes, &c. who by charter or preſcription ought to be free from toll, in caſe the ſame is exacted of them.

ESSENES, or **ESSENIANS**, in jewiſh antiquity, one of the three antient ſects among that people, who outdid the Phariſees in their moſt rigorous obſervances. They allowed a future ſtate, but denied a reſurrection from the dead. Their way of life was very ſingular: they did not marry, but adopted the children of others, whom they bred up in the inſtitutions of their ſect: they deſpiſed riches, and had all things in common; and never changed their cloaths, till they were entirely worn out. When initiated, they were ſtrictly bound not to communicate the myſteries of their ſect to others; and if any of their members were found guilty of enormous crimes, they were expelled.

Pliny tells us, that they dwelt on the weſt ſide of the lake of Aſphaltites; that they were a ſolitary kind of men, living without women or money, and feeding upon the fruit of the palm-tree: he adds, that they were conſtantly recruited by new comers, whom the ſurges of ill fortune had made weary of the world; in which manner the ſect was kept up for ſeveral thouſands of years, without any being born among them. The reaſon why we find no mention made of them in the New Teſtament, may be their recluſe and retired way of life, no leſs than their great ſimplicity and honeſty, whereby they lay open to no cenſure or reproof.

ESSENTIAL, ſomething neceſſarily belonging to the eſſence or nature of a thing, from which it cannot be conceived diſtinct; thus the primary qualities of bodies, as extenſion, figure, number, &c. are eſſential or inſeparable from them in all their changes and alterations. See the article QUALITY.

ESSENTIAL OIL, that procured from plants by diſtillation. See the article OIL.

ESSENTIAL SALTS, thoſe obtained from vegetable juices by cryſtallization. See the article SALT.

ESSEX, a county of England, bounded by Suffolk, on the north; by the German ſea, on the eaſt; by the river Thames, which divides it from Kent, on the ſouth; and by Middleſex and Hertfordſhire, on the weſt.

ESSOIN, in law, an excuſe for a perſon ſummoned to appear and anſwer to an action, on account of ſickneſs or other juſt cauſe of his abſence.

It is a kind of imparlance or craving of longer time, and obtains in real, perſonal, and mixed actions.

There are divers eſſoins, as *de ultra mare*, when the defendant is beyond ſea, whereby he is allowed forty days; in an expedition to the holy land, a year and a day; infirmity, called common eſſoin, when he is ſick in bed; and, laſtly, in the king's ſervice.

ESSOIN-DAY, is regularly the firſt day of every term, though the fourth day after is alſo allowed by way of indulgence.

ESSOIN *de malo villæ*, is where the defendant appears in court, but before pleading, falls ſick in a certain village; this is alſo allowed, if found true.

ESSOINS and PROFFERS. See the article PROFFER.

ESSORANT, in heraldry, denotes a bird ſtanding on the ground with its wings expanded, as if it had been wet, and were drying itſelf.

ESTABLISHMENT *of dower*, in law, an aſſurance of dower made to the wife by the huſband, or ſome friend of his, on marriage. See the article DOWER.

ESTAPLES, a port-town of Picardy, in France, twelve miles ſouth of Boulogne.

ESTATE, in law, ſignifies the title or intereſt that a perſon has in lands, tenements, or other effects; comprehending the whole in which a perſon hath any property, and will paſs the ſame.

Eſtates are either real or perſonal; otherwiſe diſtinguiſhed into freeholds, which deſcend to heirs; or chattels, that go to executors or adminiſtrators. See the article FREEHOLD, &c.

A fee ſimple is the ampleſt eſtate our law admits of. See the article FEE.

Eſtates are obtained ſeveral ways, as by deſcent from a father to a ſon; by conveyance or grant, from one perſon to another; by gift or purchaſe; or by deed or will. See the articles HEIR, CONVEYANCE, GRANT, &c.

ESTATES, in a political ſenſe, is uſed either

ther to denote the dominions of ſome prince, or the general claſſes into which the people are divided.

In Britain, the eſtates are the king, lords, and commons; or rather the lords and commons, who meet the king in parliament, for reforming abuſes, and enacting good and wholeſome laws. See the articles STATUTE, PARLIAMENT, *&c.* In France, there are three eſtates, *viz.* the clergy, the nobility, and the people, who make the third eſtate.

ESTATES GENERAL, in the polity of Holland. See the article STATES.

ESTE, a town of Italy, fifteen miles ſouth-weſt of Padua, and ſubject to Venice.

ESTELLA, a town of Navarre, in Spain, twenty miles ſouth-weſt of Pampeluna.

ESTEPA, a town of Spain, in the province of Granada, forty-five miles north of Malaga.

ESTETE', in heraldry, denotes the heads of beaſts torn off by main force. See the articles ARACHE' and ERASED.

ESTHER, a canonical book of the Old Teſtament, containing the hiſtory of a jewiſh virgin, dwelling with her uncle Mordecai at Shuſhan, in the reign of Ahaſuerus, one of the kings of Perſia.

The great beauty of this maid raiſed her to the throne of Perſia, whereby ſhe had an opportunity to ſave her countrymen, whoſe deſtruction was plotted by Haman, a favourite of that prince.

The learned are not agreed who this Ahaſuerus was. Archbiſhop Uſher ſuppoſes him to be Darius Hiſtaſpes, and Artyſtona to be Eſther. Scaliger makes him the ſame with Xerxes, and his queen Hameſtris to be Eſther. Joſephus, on the contrary, poſitively aſſerts, that the Ahaſuerus of the ſcriptures, is the Artaxerxes Longimanus of profane ſtory; and the ſeptuagint, throughout the whole book of Eſther, tranſlate Ahaſuerus by Artaxerxes. Moſt people ſubſcribe to this laſt opinion; and, indeed, the extraordinary kindneſs ſhewed by Ataxerxes to the Jews, can ſcarce be accounted for otherwiſe, than by ſuppoſing that they had ſo powerful an advocate as Eſther to ſolicite for them.

ESTIVAL, or ÆSTIVAL. See the article ÆSTIVAL.

ESTOILE'E, or CROSS ESTOILE'E, in heraldry, a ſtar with only four long rays in form of a croſs; and, accordingly, broad in the center, and terminating in ſharp points.

ESTONIA, a province ſubject to Ruſſia, on the north of Livonia.

ESTOPPEL, in law, an impediment or bar to an action, which ariſes from a perſon's own fact; or rather, where he is forbid by law to ſpeak againſt his deed, which he may not do, even to plead the truth. Thus where a perſon is bound in a bond by ſuch a name, and being afterwards ſued by that name on the obligation, he ſhall not be allowed to ſay he is miſnamed, but ſhall anſwer according to the bond, though it be wrong. Hence the parties in all deeds are eſtopped from ſaying any thing againſt them. However, a plaintiff is not eſtopped from ſaying any thing againſt what he had ſaid in his writ or declaration; and though parties be eſtopped, yet juries are not ſo, who may find things out of the record.

ESTOVERS, in law, is moſt generally taken for certain allowances of wood made to tenants, as houſe-bote, hedge-bote, and plough-bote; which three are comprehended under reaſonable eſtovers.

ESTRANGEL, ESTRANGELUS CHARACTER, in the ſyriac grammar, a particular ſpecies or form of ſyriac letters, ſerving as the majuſculæ letters of that language, and by ſeveral ſuppoſed to be the true antient chaldee character.

ESTRAPADE, in the manege, the defence of a horſe that will not obey, who, to get rid of his rider, riſes mightily before; and, while his forehand is yet in the air, yerks furiouſly with his hind legs, ſtriking higher than his head was before; and during this counter-time, goes back rather than advances.

ESTRAY, in law, any beaſt not wild that is found within a lordſhip, and owned by nobody: in which caſe, being cried according to law in the two next market towns adjacent, and not claimed in a year and a day by the owner, it becomes the property of the lord of the manor, or liberty wherein it was found.

If the beaſt proclaimed ſtray to another lordſhip within the year, the firſt lord cannot retake it; and where the eſtray was never duly proclaimed, the owner may take it again, at any time, upon paying the lord for keeping thereof: likewiſe the owner may ſeize an eſtray, without telling the marks or proving his property, which may be done at the trial, if conteſted; and here the tendering of amends is good, without ſhewing any particular ſum.

ESTREAT, in law, a true copy, note, or duplicate of an original writing or record, eſpecially fines, amercements, penalties, *&c.* ſet down and impoſed in the rolls of a court, to be levied by the bailiff, or other officer.

Eſtreats relate generally to fines for crimes and offences, defaults and omiſſions of perſons concerned in ſuits, and likewiſe of officers. Non-appearance of defendants and jurors, *&c.* and before proceſs iſſues to levy forfeitures on recognizances to the king's uſe, the recognizances muſt be firſt eſtreated into the exchequer by ſheriffs of counties. Fines, poſt fines, and forfeitures, are to be eſtreated twice a year on pain of 50 l. and it is the courſe of the king's bench to ſend their eſtreats into the exchequer on the laſt days of the two iſſuable terms.

ESTREMADURA, a province of Spain, bounded by Leon, on the north; by the two Caſtiles, on the eaſt; by Andaluſia, on the ſouth; and by the province of Alentejo, in Portugal, on the weſt.

ESTREMADURA is alſo a province of Purtugal, lying north of Alentejo, and weſtward of ſpaniſh Eſtremadura. Liſbon is its capital, as alſo of the kingdom.

ESTREMOS, a town of Alentejo, in Portugal, eighty-five miles ſouth-eaſt of Liſbon.

ESTREPEMENT, in law, any ſpoil made by tenants for life on any lands, *&c.* to the prejudice of the reverſioner: it is alſo taken to ſignify the making land barren, by continual plowing and ſowing, and thereby drawing out the heart of the ground without manuring, or rather good huſbandry, by which means it is impaired.

It may likewiſe be applied to the cutting down of trees, or lopping them farther than the law allows.

There is alſo a writ of eſtrepement that lies in two caſes, *viz.* the one is where a perſon having an action depending, as a formedon or writ of right, *&c.* ſues to prohibit the tenant from making waſte. The other is for the demandant, who is adjudged to recover ſeiſin of the land, before execution, ſued out by the writ habere facias poſſeſſionem, in order to prevent waſte being made before he gets into poſſeſſion.

ESULA, in botany, a kind of ſpurge, comprehended under the euphorbia of Linnæus.

It is one of the ſharpeſt and moſt acrid ſpurges, and therefore hardly ſafe: it purges violently, both by vomit and ſtool. Some recommend it in dropſies, but it ſhould be uſed with great caution; and it is a good method to macerate it a day or two in vinegar, before it is uſed.

ESURINE SALTS, ſuch as are of a corroding, fretting, and eating nature; abounding chiefly in places near the ſea-ſide, and where great quantities of coals are burnt, as appears from the ſpeedy ruſting of iron bars in windows of houſes built in ſuch places.

ESWEGEN, or ESCHWEGE, a town of Germany, twenty-five miles ſouth-eaſt of the city of Caſſel.

ETAPPE, a term uſed, in the french armies, for the proviſions and forrage allowed an army in their rout through a kingdom, whether going into winter-quarters, or returning to take the field. Hence, etapier is the undertaker or perſon who contracts with the country or territory, for furniſhing the ſaid proviſions.

ETCHING, a method of engraving on copper, in which the lines or ſtrokes, inſtead of being cut with a tool or graver, are eaten in with aquafortis.

Etching is done with more eaſe and expedition than engraving: it requires fewer inſtruments, and repreſents moſt kind of ſubjects better and more agreeable to nature, as landſcapes, ruins, grounds, and all ſmall, faint, looſe, remote objects, buildings, *&c.* See ENGRAVING.

The method of etching is as follows: chooſe the copper-plate as directed for engraving, and furniſh yourſelf with a piece of ground, tied up in a bit of thin ſilk, kept very clean, to be laid upon the plate when both have been warmed; proper needles to hatch with on the ground; a pencil or bruſh, to wipe away the bits of ground which riſe after hatching; a poliſher; two or three gravers; a pair of compaſſes, to meaſure diſtances and draw circles; a ruler, to hatch ſtraight lines; green wax, to make the wall round the edges of the plate, to contain the aquafortis; an oil-ſtone; a bottle of aquafortis; ſome red lead, to colour the backſide of the copy; a ſtift and a hand-vice, to hold the plate over the candle. See the articles NEEDLE, GRAVER, POLISHER, COMPASS, *&c.*

To make the ground, take three ounces of aſphaltum, two ounces of clean roſin, half an ounce of burgundy-pitch, three ounces of black wax, and three ounces of virgin's wax: let all theſe be melted in a clean earthen pipkin over a ſlow fire, ſtirring it all the time with a ſmall ſtick; if it burn to the bottom, it is ſpoiled. After the ingredients are well melted, and it boils up, put it into a pan of fair water; and before it be quite cold, take it out, and roll it into ſmall lumps to be kept from duſt: this ground is what others call the varniſh. The next thing is to clean the plate to receive the ground: take a piece of liſting, roll it up as big as an egg, tie it very tight, ſo as to make it a rubber, and having dropped a ſmall quantity of ſweet oil, and added a little powder of rotten-ſtone on the plate, rub it with this ball, till it will almoſt ſhew your face. Then wipe it all off with a clean rag, and after that, make it quite dry with another clean rag, and a little fine whiting.

The next thing is to lay on the varniſh; to do which aright you muſt take a hand-vice, and fix it at the middle of one part of the plate, with a piece of paper between the teeth of the hand-vice and the plate, to prevent the marks of the teeth: then laying the plate on a chaffing-diſh, with a ſmall charcoal fire in it, till the plate be ſo hot, that, by ſpitting on the backſide, the wet will fly off: rub the plate with the ground tied up in ſilk, till it be covered all over; and after that dawb the plate with a piece of cotton wrapped up in ſilk till the ground be quite ſmooth, keeping the plate a little warm all the time. The varniſh being thus ſmoothed upon the plate, it muſt be blacked in the following manner: Take a thick tallow candle that burns clear, with a ſhort ſnuff, and having driven two nails into the wall, to let it reſt upon, place the plate againſt the wall with the varniſh ſide downward, and take care not to touch the ground with your fingers: then taking the candle, apply the flame to the varniſh as cloſe as poſſible, without touching the varniſh with the ſnuff of the candle, and guide the flame all over it, till it become perfectly black. After this is done, and the plate dry, the deſign is traced with a needle through the varniſh, and a rim or border of wax is raiſed round the circumference of the plate; and then the artiſt has a compoſition of common varniſh and lamp-black, made very thin, wherewith he covers the parts that are not to be bitten, by means of a hair pencil. And he is every now and then covering or uncovering this or that part of the deſign, as occaſion may require; the conduct of the aquafortis being the principal concern, on which the effect of the print very much depends. The operator muſt be attentive to the ground, that it does not fail in any part, and where it does, to ſtop up the place with the above compoſition. The plate is defended from the aquafortis every where, but in the lines or hatches cut through it with the needle, through which the water eats into the copper to the depth required; remembering to keep it ſtirring with a feather all the while, which done, it is to be poured off again.

Single aquafortis is moſt commonly uſed; and if it be too ſtrong, mix it with vinegar, otherwiſe it will make the work very hard, and ſometimes break up the ground: the aquafortis having done its part, the ground is taken off, and the plate waſhed and dried: after which nothing remains for the artiſt but to examine the work with his graver, to touch it up, and heighten it where the aquafortis has miſſed.

And, laſtly, it is to be remembered, that a freſh dip of aquafortis is never given, without firſt waſhing out the plate in fair water, and drying it at the fire.

ETERNITY, an attribute of God, expreſſing his infinite or endleſs duration. See the article GOD.

According to Mr. Locke, we come by the idea of eternity, by being able to repeat any part of time, as a year, as often as we will, without ever coming to an end.

ETHELING, or ATHELING. See the article ATHELING.

ETHER and ETHERIAL. See the articles ÆTHER and ÆTHERIAL.

ETHICS, or MORALITY, the ſcience of manners or duty, which it traces from man's nature and condition, and ſhews to terminate in his happineſs; or, in other words, it is the knowledge of our duty and felicity, or the art of being virtuous and happy.

Moral philoſophy inquires, not how man might have been, but how he is conſtituted; not into what principles or diſpoſitions his actions may be artfully reſolved, but from what principles and diſpoſitions they actually flow; not what he may, by education, habit, or foreign influence, come to be or do, but what by his nature, or original frame, he is framed to be and do. From a view, therefore, of man's faculties, appetites and paſſions, it appears, that the health and perfection of man muſt be in the ſupremacy of conſcience and reaſon, and in the ſubordination of the paſſions and affections to their authority and direction; and his virtue or goodneſs muſt conſiſt in acting agreeably to this order and oeconomy.

It is true, ſome eminent philoſophers have attempted to lay the foundation of morals much deeper, and on a more large and firm bottom, *viz.* the natures and reaſons, the truth and fitneſſes of things. Senſes and affections, they tell us, are vague and precarious; and though they were not, yet irrational principles of action, and conſequently very improper foundations, on which to reſt the eternal and immutable obligations of morality. Hence they talk much of the abſtract natures and reaſons of things, of eternal differences, unalterable relations, fitneſſes and unfitneſſes reſulting from thoſe relations; and from theſe eternal reaſons, differences, relations, and their conſequent fitneſſes, they ſuppoſe moral obligation to ariſe. A conduct agreeable to them, or, in other words, to truth, they call virtue; and the reverſe, vice.

But the truth is, that we might perceive all the poſſible relations, differences, and reaſons of things, and yet be wholly indifferent to this or that conduct, unleſs we were endued with ſome ſenſe or affection, by which we approved and loved the one, and diſapproved and diſliked the other conduct. Reaſon may perceive a fitneſs to a certain end, but without ſome ſenſe or affection we cannot propoſe, or indeed have any idea of an end; and, without an end, we cannot conceive any inducement to action. Therefore, before we can underſtand the natures, reaſons, and fitneſſes of things, which are ſaid to be the foundation of morals, we muſt know what natures are meant, to what ends they are fitted, and from what principles or affections they are prompted to act; otherwiſe we cannot judge of the duty required, or of the conduct becoming that being whom we ſuppoſe under moral obligation. But let the natures be once given, and the relations which ſubſiſt among them be aſcertained, we can then determine what conduct will be obligatory to ſuch natures, and adapted to their condition and œconomy. And to the ſame natures, placed in the ſame relations, the ſame conduct will be eternally and invariably proper and obligatory.

Beſides, to call morality a conformity to truth, gives no idea, no characteriſtic of it, but what ſeems equally applicable to vice. For whatever propoſitions are predicable of virtue, as, that it flows from good affections, or is agreeable to the order of our nature, tends to produce happineſs, is beheld with approbation, and the like; the contrary propoſitions are equally true, and may be equally predicated of vice.

Another ſet of philoſophers eſtabliſh morals upon the will or poſitive appointment of the Deity, and call virtue a conformity to that will, or appointment. All obligation, they ſay, ſuppoſes one who obliges, or who has a right to preſcribe, and can reward the obedient, and puniſh the diſobedient. This can be none but the Creator. His will, therefore, is our law, which we are bound to obey. And this, they tell us, is only ſufficient to bind or oblige ſuch imperfect and corrupt creatures as we are, who are but feebly moved with a ſenſe of the beauty and excellency of virtue, and ſtrongly ſwayed by paſſion, or views of intereſt.

This ſcheme of morality entirely coincides with that deduced from our inward ſtructure and condition, ſince theſe are the effects of the divine will. Whatever therefore is agreeable, or correſpondent to our inward ſtructure, muſt likewiſe be agreeable, or correſpond to the will of God. So that all the indications, or ſanctions of our duty, which are declared or enforced by our ſtructure, are, and may be, conſidered as indications or ſanctions of the will of our Creator. If theſe indications, thro' inattention to, or abuſe of our ſtructure, prove inſufficient to declare; or if theſe ſanctions, through the weakneſs or wickedneſs of men, prove inſufficient to enforce obedience to the divine will, and the Deity is pleaſed to add new indications, or new ſanctions; theſe additional indications and ſanctions cannot, and are not ſuppoſed, by the aſſertors of this ſcheme, to add any new duty, or new moral obligation; but only a new and purer promulgation of our duty, or a new and ſtronger ſanction or motive from intereſt, to perform that duty, and to fulfil that obligation to which we were bound before. It makes no difference, as to the matter of obligation, after what manner the will of our Creator is enforced, or declared to us, whether by word or writ, or by certain inward notices and determinations of our own minds, ariſing according to a neceſſary law of our nature. Again, if the ſcheme of duty, as deduced from moral perceptions, and the affections of our nature, be thought too ſlight a foundation on which to reſt morality, becauſe theſe are found inſufficient to bind, or rather to compel men to their duty, we fear the ſame objection will militate againſt the ſcheme of conformity to the divine will, ſince all the declarations and ſanctions thereof have not hitherto had their due effect, in producing a thorough and univerſal reformation.

When ſome ſpeak of the will of God, as the rule of duty, they do not certainly mean a blind, arbitrary principle of action, but ſuch a principle as is directed by reaſon, and governed by wiſdom, or a regard to certain ends in preference to others: for unleſs we ſuppoſe ſome principle in the Deity analogous to our ſenſe of obligation, ſome antecedent affection, or determination of his nature, to prefer ſome ends before others, we cannot aſſign any ſufficient reaſon why he ſhould will one thing more than another, or have any election at all. Whatever therefore is the ground of his choice, or will, muſt be the ground of obligation, and not the choice or will itſelf. That this is the caſe, appears farther from the common diſtinction which divines and philoſophers make between moral and poſitive commands and duties. The former they think obligatory antecedent to will, or at leaſt to any declaration of it; the latter, obligatory only in conſequence of a poſitive appointment of the divine will. But what foundation can there be for this diſtinction, if all duty and obligation be equally the reſult of mere will?

Before we conclude this article, it will be proper to ſay ſomething of the extraordinary hypotheſis of Hobbes, concerning the foundation of morality. This philoſopher, who ſaw his country involved in all the diſtraction and miſery of a civil war, ſeems to have taken too narrow and partial a view of our nature, and has therefore drawn it in a very odious and uncomfortable light. Next to the deſire of ſelf-preſervation, he makes the love of glory and of power to be the governing paſſions in man; and from theſe, by an arbitrary, unnatural, and unſupported hypotheſis, contrary to common experience, and common language, he attempts to deduce all the other paſſions which inflame the minds, and influence the manners of men. According to him, all men are equal, all deſire and have a right to the ſame things, and want to excel each other in power and honour; but as it is impoſſible for all to poſſeſs the ſame things, or to obtain a preheminence in power and honour, hence muſt ariſe a ſtate of war and mutual carnage; which is what he calls a ſtate of nature. But this ſhrewd philoſopher ſubjoins, that men being aware that ſuch a ſtate muſt terminate in their own deſtruction, agreed to ſurrender their private unlimited right into the hands of the majority, or ſuch as the majority ſhould appoint, and to ſubject themſelves for the future to common laws, or to common judges or magiſtrates. In conſequence of this ſurrender, and of this mutual compact or agreement, they are ſecured againſt mutual hoſtilities, and bound or obliged to a peaceable behaviour: ſo that it is no longer lawful or juſt (he certainly means ſafe or prudent) to invade and incroach on one another, ſince this would be a violation of his promiſe. But one may aſk him, what obligation is a man under to keep his promiſe, or ſtand to his compact, if there be no obligation, no moral tie diſtinct from that promiſe? On the whole, his ſtate of nature is a mere chimera, and the ſuperſtructure he has raiſed on it no leſs ſo.

ETHIOPIA, or ÆTHIOPIA, a very extenſive country of Africa, comprehending Abyſſinia, Nubia, and Abex: it is bounded by Egypt, and the deſart of Barca on the north, by the Red ſea, and Indian Ocean on the eaſt, by Anian, and the unknown parts of Africa on the ſouth, and by other unknown countries on the weſt. See ABEX and NUBIA.

ETHIOPIC YEAR. See the article YEAR.

ETHMOIDAL, in anatomy, one of the common ſutures of the ſkull, which goes round the os ethmoides, from which it derives its name, ſeparating it from the bone in contact with it.

ETHMOIDES OS, in anatomy, the ſame with cribroſum os, or cubiforme. See the article CRIBROSUM.

ETHNARCH, *etchnarcha*. See the article ÆCHMALOTARCHA.

ETHNOPHRONES, in church-hiſtory, heretics of the ſeventh century, who, profeſſing chriſtianity, joined thereto all the ceremonies and follies of paganiſm, ſuch as judicial aſtrology, divinations of all kinds, &c. and who obſerved all the feaſts, times, and ſeaſons of the Gentiles.

ETHOPOEIA, or ETHOLOGY, in rhetoric, a draught, or deſcription, expreſſing the manners, paſſions, genius, tempers, aims, &c. of any perſon. Such is that noted picture of Cataline, as drawn by Salluſt: *fuit magna vi & animi*, &c. "he was a man of great vigour both "of body and mind; but of of a diſ- "poſition extremely profligate and de- "praved. From his youth he took "pleaſure in civil wars, maſſacres, "depredations, and inteſtine broils; "and in theſe he employed his younger "days. His body was formed for en- "during cold, hunger, and want of "reſt, to a degree indeed incredible: "his ſpirit was daring, ſubtle, and "changeable: he was expert in all the "arts of ſimulation and diſſimulation, "covetous of what belonged to others, "laviſh of his own, violent in his paſ- "ſions: he had eloquence enough, but "a ſmall ſhare of wiſdom: his bound- "leſs ſoul was conſtantly engaged in "extravagant and romantic projects, "too high to be attempted."

ETHUSA, FOOL'S PARSLEY, in botany, a genus of the pentandria-digynia claſs of plants, the general corolla of which is commonly uniform; the partial one conſiſts of five inflexo-cordated, unequal petals: the fruit is naked, of a roundiſh oval figure, and ſeparable in two parts: the ſeeds are two, roundiſh, ſtriated, and thence a third part plane.

ETNA, or mount GIBELLO, a vulcano, or burning mountain of Sicily, ſituated fifty miles ſouth-weſt of Meſſina, and twenty weſt of Catania. See VULCANO.

ETYMOLOGY, that part of grammar which conſiders and explains the origin and derivation of words, in order to arrive at their firſt and primary ſignification, whence Quintilian calls it *originatio*.

A judicious enquiry into etymologies, is thought by ſome of conſiderable uſe; becauſe nations, who value themſelves upon their antiquity, have always looked on the antiquity of their language as one of the beſt titles they could plead; and the etymologiſt, by ſeeking the true and original reaſon of the notions and ideas affixed to each word and expreſſion, may often furniſh an argument of antiquity, from the traces remaining thereof, compared with the antient uſes. Then that etymologies are neceſſary for the thorough underſtanding of a language.

It is objected, however, that the art is arbitrary, and built altogether on conjectures and appearances; and the etymologiſts are charged with deriving their words from where they pleaſe; and indeed it is no eaſy matter to go back into the antient britiſh and gauliſh ages, and to follow, as it were, by the track, the various imperceptible alterations a language has undergone from age to age; and as thoſe alterations have ſometimes been merely owing to caprice, it is eaſy to take a mere imagination or conjecture for a regular analogy: ſo that it is no wonder the public ſhould be prejudiced againſt a ſcience, which ſeems to ſtand on ſo precarious a footing. It muſt certainly be owned, that etymologies are frequently ſo far fetched, that one can ſcarce ſee any reſemblance or correſpondence therein. Quintilian has ſhewn, that the antient etymologiſts, notwithſtanding all their learning, fell into very ridiculous derivations.

The etymologies of our engliſh words has been derived from the Saxon, Welch, Walloon, Daniſh, Latin, Greek, &c. See the article ENGLISH.

EU, a port town of Normandy, in France, fifteen miles north-eaſt of Dieppe.

EVACUANTS, in pharmacy, are properly ſuch medicines as diminiſh the animal fluids, by throwing out ſome morbid or redundant humour, or ſuch as thin, attenuate, and promote the motion and circulation thereof. See the article ATTENUANTS, &c.

Evacuating medicines are prejudicial in intermitting fevers; they are prejudicial as they weaken, exhauſt the moſt fluid juices, and diſturb the concoctions and digeſtions which are here more eſpecially neceſſary.

EVACUATION, in medicine, the art of diminiſhing, emptying, or attenuating the humours of the body.

Evacuations are, by Dr. Pringle, much recommended in the bilious fever and dyſentery: but this ſort of medicine is to be ſparingly uſed in malignant fevers: in wounds of the head the beſt evacuations are plentiful bleeding and purging of the bowels; both which are to be made at one and the ſame time, as plentifully as the patient's ſtrength will permit; and to be repeated again as often as neceſſary, if you find the ſymptoms relieved after their adminiſtration.

Evacuations are bad in nauſeas, from a diſturbance of the ſpirits; but are of great uſe in curing the delirium in fevers: the provoking the menſes in women, is to be attempted by ſuch remedies as mollify and relax, and not by thoſe called emmenagoges, moſt of which increaſe the impetus of the circulation, except in women of a cold and lax habit: blood-letting likewiſe ſupplies the deficiency of the piles, or menſtrual diſcharge in men, by making this artificial evacuation of blood in a part the moſt remote from the head. But all theſe evacuations are only of uſe where the veſſels are diſtended with too great a quantity of blood, or when the force of the circulation is too great. In intermitting fevers evacuations are very imprudent. In inflammatory diſorders, where the chief intention ſhould alſo be to diminiſh the force of the blood, to thin it, and to relax the fibres, evacuations, ſuch as bleeding, purging, vomiting, attenuants, and diaphoretics, are the chief remedies.

EVANGELIST, a general name given to thoſe who write, or preach the goſpel of Jeſus Chriſt.

The word is of greek origin, ſignifying one who publiſhes glad tidings, or is the meſſenger of good news.

According to Hooker, evangeliſts were preſbyters of principal ſufficiency, whom the apoſtle ſent abroad, and uſed as agents in eccleſiaſtical affairs, whereſoever they ſaw need.

The term evangeliſt, however, is at preſent confined to the writers of the four goſpels. See the article GOSPEL.

EVANID, a name given by ſome authors to ſuch colours as are of no long duration, as thoſe in the rainbow, in clouds before and after ſun-ſet, *&c.*

Evanid colours are alſo called fantaſtical and emphatical colours.

EVANTES, in antiquity, the prieſteſſes of Bacchus, thus called, by reaſon, that in celebrating the orgia, they ran about as if diſtracted, crying, *evan, evan, ohé evan.* See BACCHANALIA.

EVAPORATION, in chemiſtry, the ſeting a liquor in a gentle heat to diſcharge its ſuperfluous humidity, reduce it to a proper conſiſtence, or obtain its dry remainder.

Evaporation may be accounted for from hence, that when the particles are ſo far ſeparated by heat, as to be without each others attraction, they then begin to repeal each other, and thus will ſeem to riſe from the ſurface of the fluid in the form of a vapour, or body of particles, which are at equal diſtances from each other; and becoming thus ſpecifically lighter than the ſame bulk of airy particles, they will riſe in the fluid body of the air, where they form clouds, meteors, *&c.* See CLOUD, METEOR, *&c.*

EVASION, among lawyers, denotes a cunning or ſubtile endeavouring to ſet aſide, or eſcape the puniſhment of the law; as where one ſays to another, that he will not ſtrike him, but he will give him a ſhilling to ſtrike firſt: in ſuch a caſe, if the perſon who gives the firſt ſtroke be killed, it is murder, for no perſon ſhall evade the juſtice of the law, by any ſuch pretence to ſcreen his malice.

EVATES, a branch or diviſion of the druids, or antient celtic philoſophers. Strabo divides the britiſh and gauliſh philoſophers into three ſects, bards, Βαρδοι, evates, Ουατεις, and druids, Δρυιδαι. He adds, that the bards were the poets and muſicians; the evates the prieſts and naturaliſts; and the druids were moraliſts as well as naturaliſts: but Marcellus and Hornius reduce them all to two ſects, *viz.* the bards and druids.

EUBAGES, an order of prieſts, or philoſophers, among the antient Celtæ, or Gauls: ſome will have the eubages to be the ſame with the druids, and ſaronidæ of Diodorus; and others that they were the ſame with what Strabo calls evates.

EUCHARIST, ευχαριστια, the ſacrament of the Lord's ſupper, properly ſignifies giving of thanks.

This ſacrament was inſtituted by Chriſt himſelf, and the participation of it called communion. See COMMUNION.

As to the manner of celebrating the euchariſt, among the antient Chriſtians, after the cuſtomary oblations were made, the deacon brought water to the biſhop and preſbyters, ſtanding round the table, to waſh their hands, according to that of the pſalmiſt, "I will waſh my hands "in innocency, and ſo will I compaſs "thy altar, O Lord." Then the deacon cried out aloud, "Mutually embrace "and kiſs each other;" which being done, the whole congregation prayed for the univerſal peace and welfare of the church, for the tranquillity and repoſe of the world, for the proſperity of the age, for wholſome weather, and for all ranks and degrees of men. After this followed mutual ſalutations of the miniſter and people; and then the biſhop, or preſbyter, having ſanctified the elements, by a ſolemn benediction, he brake the bread, and delivered it to the deacon, who diſtributed it to the communicants; and after that the cup. Their ſacramental wine was uſually diluted, or mixed with water. During the time of adminiſtration, they ſang hymns and pſalms, and having concluded with prayer and thankſgiving, the people ſaluted each other with a kiſs of peace, and ſo the aſſembly broke up.

EUCHOLOGIUM, ευχολογιον, in the greek church, the ritual, or book of common-prayer of that church. See RITUAL.

EUDISTS, a congregation of miſſionary prieſts, in France, aſſociated under the name and title of Jeſus and Mary. It is governed by a ſuperior, who receives his power from the biſhops of each dioceſe, where they have an eſtabliſhment.

EVE, the ſame with vigil. See VIGILS.

EVE'CTION, or LIBRATION, *of the moon*, in aſtronomy, is an inequality in her motion, by which, at or near the quadratures, ſhe is not in a line drawn through the center of the earth to the ſun, as ſhe is at the ſyzygies, or conjunction and oppoſition, but makes an angle with that line of about 2 degrees 51 min. The motion of the moon about its axis is alone equable, performing its revolution exactly in the ſame time as it rolls round the earth; and thence it is that it nearly always turns the ſame face towards us. But this equality, and the unequal motion of the moon in her ellipſis, is the cauſe why the moon, ſeen from the earth, appears to librate a little upon its axis, ſometimes from eaſt to weſt, and ſometimes from weſt to eaſt; and ſome parts in the eaſtern limb of the moon go backwards and forwards a ſmall ſpace, and ſome that were conſpicuous, are hid, and then again appear.

EVEN NUMBER, in arithmetic, that which can be divided into two equal parts: ſuch are 4, 10, 40, &c.

A number is ſaid to be evenly even, when being even itſelf, it is meaſured by an even one, an even number of times: ſuch is 32, as being meaſured by the even number 8, an even number of times 4. Evenly odd number is, that which an even number doth meaſure by an odd one: ſuch is 30, which 2 or 6, both even numbers, do meaſure by 15 or 5, odd ones.

EVERARD's SLIDING-RULE. See the article RULE.

EVERDING, a town of Auſtria, in Germany, ſituated on the Danube, twelve miles weſt of Lints.

EVER-GREEN, in gardening, a ſpecies of perennials, which continue their verdure, leaves, &c. all the year: ſuch are hollies, phillyria's, lauruſtinus's, bays, pines, firs, cedars of Lebanon, &c.

EVERLASTING-FLOWER, in botany, a name given to the amaranthoides.

EVERLASTING-PEA, a genus of plants, otherwiſe called lathyrus.

EVESDROPPERS, in law, perſons who ſtand under the eves, walls, or windows of a houſe, by day or by night, to liſten after news, and carry it to others, thereby raiſing ſtrife and contention in the neighbourhood. They are puniſhable in the court-leet, or quarter-ſeſſions.

EVESHAM, a borough-town thirteen miles ſouth-eaſt of Worceſter, which ſends two members to parliament.

EUGENIA, the SILVER-TREE, in botany, a genus of the icoſandria-monogynia claſs of plants, the corolla whereof conſiſts of four oblong, obtuſe, concave petals, twice as large as the cup: the fruit is a quadrangular, coronated drupe, containing only one cell: the ſeed is a roundiſh, ſmooth nut.

EUGUBIO, a town and biſhop's ſee of Italty, in the dutchy of Urbino, and thirty-five miles ſouth of that city.

EVIAN, a town of Savoy, ſituated twenty-five miles north-eaſt of Geneva, on the ſouth ſide of the lake of Geneva.

EVICTION, in law, ſignifies a recovery of lands, or tenements by law.

When lands, &c. are evicted before rent reſerved upon a leaſe becomes due, the leſſee is not liable to pay any rent. Likewiſe, if on an exchange of lands, either of the parties is evicted of the land given in exchange, the party evicted may, in that caſe, re-enter his own lands. And a widow being evicted of her thirds, ſhall be endowed in the other lands of the heir.

EVIDENCE, according to the Epicureans, is nothing elſe than that kind of certitude obtained by the ſenſes, which, in the opinion of theſe philoſophers, are the primary criterion of truth.

By evidence of ſenſe the epicureans mean that ſpecies, or image, exhibited by the ſenſe, or phantaſy, which, when all impediments to a juſt judging, as diſtance, motion, medium, &c. are removed, cannot be contradicted, or gainſaid: wherefore the queſtion being put, whether or no a thing be juſt as it appears: the anſwer is not given till it have been tried and examined all the ways, and by all the ſenſes that it can be an object of. Some diſtinguiſh evidence into objective and formal.

Objective evidence, they ſay, conſiſts in the clearneſs or perſpicuity of the object; or the object itſelf ſo conſtituted as that it may be clearly and diſtinctly known. An object may be clearly known, either immediately from the bare explication of the terms of a propoſition; or mediately, that is, we may arrive at a clear and diſtinct knowledge of it, by means of ſome medium; thus ſpace, according to the Epicureans, becomes evident by reaſon of motion, becauſe there can be no motion where there is no ſpace.

Formal evidence is the act of the intellect conſidered as clear and diſtinct; and this is alſo immediate, or ſuch as conſiſts or depends upon the primary principles; or it is mediate, and requires ſome medium whoſe attribute agrees with the ſubject of the propoſition. The former conſiſts in a certain natural light of the intellect, which is acquired without any ſtudy or pains: the latter is found no where but in the concluſion of demonſtration, and is therefore termed mediate evidence. See the article DEMONSTRATION.

Others divide evidence into moral, phyſical, and metaphyſical; that is, by how many means the truth appears, by ſo many is the evidence ſaid to ariſe: thus, a thing is ſaid to be morally evident, ſo far as I have a diſtinct knowledge or notion thereof by unexceptionable witneſſes. See the article CERTITUDE.

Phyſically, ſo far as natural ſenſe and reaſon, pointing out any thing, convinces me thereof. Metaphyſically, when I enter ſo fully and clearly into the eſſence of any thing that nothing can be clearer.

But whatever may be the ſentiments of theſe philoſophers concerning evidence, ſays Chauvinus, this ſhould at leaſt be granted, that the evidence of human knowledge, of what kind ſoever it be, is not abſolute, but comparative: that is, that there is no act in human knowledge quite void of all confuſion.

The primary ſign of evident knowledge requires that the object known ſhould ſtrike the intellect violently, in like manner as a vehement light beats upon the eye: the ſecond ſign requires that the mind ſhould acquieſce, with great calmneſs and tranquillity, in diſtinct notions, as it were abiding ſecurely in the midſt of the light. The third ſign of evidence is ſought from ſubſequent judgments, and transferred to our notions or ideas: for clear and diſtinct notions will lay the underſtanding under the neceſſity of judging, and certain and undoubted judgments follow diſtinct and clear ideas. The fourth and laſt ſign of evidence is when the common and univerſal conſent of mankind univerſally agree upon one particular point, it follows that the idea obtained concerning that thing is a clear and diſtinct one.

Evidence muſt therefore be allowed the mark of truth; and theſe things muſt be allowed true, which carry with them ſuch a degree of evidence as obliges us to aſſent to them. Whatever we ſee evidently agreeable to things whereof we ſpeak, that we muſt acknowledge to be true.

EVIDENCE, in law, any proof, whether it be by teſtimony of men on oath, or by writings and records ſo called, becauſe hereby the point in iſſue is made evident to the jury.

As to evidence, the common law requires no certain number of witneſſes, though in ſome caſes the ſtatute-law does. The teſtimony of one ſingle evidence is ſufficient for the crown in all cauſes, except treaſon, where there muſt be two: ſometimes violent preſumption will be admitted as evidence, without witneſſes, as where a perſon is run thro' the body in a houſe, and one is ſeen to come out of that houſe with a bloody ſword. In general, a party intereſted in a ſuit, a wife for or againſt her huſband, unleſs in caſes of treaſon, an alien infidel, perſons *non ſaniæ memoriæ*, ſuch as are convicted of felony, perjury, &c. may not be evidence in the cauſe: but kinſmen, though never ſo near, alſo tenants, ſervants, maſters, attornies for their clients, one of the jurors upon trial, and all others that are not infamous, and who want not underſtanding, or are no parties in intereſt, may be allowed to give evidence; tho' the credit of ſervants is left to the jury.

In caſes of crimes, as of robbery on the highway, in an action againſt the hundred, and rapes of women, &c. a man or woman may be an evidence in their own cauſe; ſo likewiſe in private notorious cheats, where none elſe can be witneſs of the circumſtances of the fact, but he that ſuffers. When any perſon is ſerved with a proceſs, and refuſes to appear to give evidence in a criminal cauſe, the court may put off the trial, and grant an attachment againſt him; whereupon he ſhall be committed to priſon and fined; and in a civil cauſe an evidence refuſing to appear on being tendered his reaſonable charges, and he having no lawful excuſe, action of the caſe lies againſt him, and thereupon 10 l. damages ſhall be recovered, and other recompence to the party.

Evidence by writings and records is where acts of parliaments, ſtatutes, judgments, fines and recoveries, proceedings of court, and deeds, &c. are admitted as evidence. And here it is to be obſerved, that the printed ſtatute-book is good evidence upon a general act of parliament, which need not be pleaded; but in the caſe of a private act, it is otherwiſe: for there it muſt be pleaded and examined by the records of parliament, before it can be admitted in evidence. Records and enrolments prove themſelves, and a copy of a record ſworn to may be given as an evidence. A record of an inferior court has been rejected in evidence, and the proceedings in county-courts, courts-baron, &c. may be denied, and then tried by a jury. A copy of copyhold-lands ſhall be an evidence where the rolls are loſt. An antient deed proves itſelf: the counter part of a deed is no evidence, when the original is in being, and can be procured.

Although a witneſs ſwear to the hand and contents of a letter, if he never ſaw the party write, it will not be good evidence. And a ſhop-book may not be given in evidence for goods ſold, &c. after one year, before the action brought, except there be a bill, &c. for the debt: but this does not extend to any buying or ſelling, or trading between one tradeſman and another; here to make books evidences, there muſt be the hand of the perſon to them who delivered the goods which is to be proved. In debt, a releaſe may be given in evidence, ſo may any matters of fact, tampering with witneſſes, or fraud.

EVIL, *malum*, in philoſophy, &c. is either moral or natural.

Moral evil is the diſagreement between the actions of a moral agent, and the rule of thoſe actions, whatever it be. See the articles ETHICS and GOOD.

Moral good and evil coincide with right and wrong, ſince that cannot be good which is wrong, nor that evil which is right.

Some make the eſſence of moral evil conſiſt in the diſagreement of our manners to the divine will, whether known by reaſon or revelation; others, in being contrary to reaſon and truth; and others, in being inconſiſtent with the nature, faculties, affections, and ſituation of mankind.

Be this as it will, no act can be deemed morally evil, unleſs the agent be capable of diſtinguiſhing, chooſing, and acting for himſelf; or more briefly, is an intelligent and free agent. See the articles AGENT and ACTION.

Natural **EVIL**, whatever deſtroys, or any way diſturbs the perfection of natural beings: ſuch are blindneſs, diſeaſes, death, &c. See the articles BLINDNESS, DISEASE, DEATH, &c.

King's **EVIL**, in medicine, the ſame with the ſcrophula. See SCROPHULA.

Hungry **EVIL**. See BULIMY.

EULOGY, in church hiſtory, a name by which the Greeks call the *panis benedictus*, or bread over which a bleſſing is pronounced, and which is diſtributed to thoſe who are unqualified to communicate.

The name euologiæ was antiently given to the conſecrated pieces of bread, which the biſhops and prieſts ſent to each other, for the keeping up a friendly correſpondence: thoſe preſents likewiſe which were made out of reſpect or obligation, were called eulogiæ.

St. Paulinus, biſhop of Nola, about the end of the ſixth century, having ſent five eulogiæ, at one time, to Romanian, ſays, "I ſend you five pieces of bread, "the ammunition of the warfare of "Jeſus Chriſt, under whoſe ſtandard "we fight."

EUMENIDES, furies, in antiquity. See the article FURIES.

EUNOMIANS, in church hiſtory, chriſtian heretics, in the fourth century. They were a branch of Arians, and took their name from Eunomius, biſhop of Cyzicus, who was inſtructed by Ætius, in the points which were then controverted in the church, after having at firſt followed the profeſſion of arms. Eunomius ſo well anſwered the deſigns of his maſter, and declaimed ſo vehemently againſt the divinity of the WORD, that the people had recourſe to the authority of the prince, and had himſelf baniſhed; but the Arians obtained his recall, and elected him biſhop of Cyzicus. The manners and doctrines of the Eunomians were the ſame with thoſe of the Arians.

EUNUCH, ευνȣχος, a caſtrated perſon. See the article CASTRATION.

In Britain, France, *&c.* eunuchs are never made, but upon occaſion of ſome diſeaſe, which renders ſuch an operation neceſſary: but in Italy, they make great numbers of children, from one to three years of age, eunuchs, every year, to ſupply the opera's and theatres of all Europe with ſingers: though it is not one in three, that, after having loſt their virility, has a good voice for a recompence. In the eaſtern parts of the world, they make eunuchs in order to be guards or attendants on their women. The ſeraglio of the eaſtern emperors are chiefly ſerved and guarded by eunuchs; and yet, from good authority, we learn, that the rich eunuchs in Perſia and other countries keep ſeraglio's for their own uſe. Thoſe who, out of an imprudent zeal to guard themſelves from ſenſual pleaſures, made themſelves eunuchs, were, by the council of Nice, condemned and excluded from holy orders. There are ſeveral ſevere prohibitions in Germany againſt the making of eunuchs; and in France an eunuch muſt not marry, not even with the conſent of the woman.

EUNUCHS, in church hiſtory, a ſet of heretics, in the third century, who were mad enough to caſtrate, not only thoſe of their own perſuaſion, but even all others that they could lay hold of: they took their riſe from the example of Origen, who, miſunderſtanding the following words of our Saviour,——"And "eunuchs who made themſelves eu"nuchs for the kingdom of heaven," caſtrated himſelf.

EVOCATION, EVOCATION, in roman antiquity, a ſolemn invitation preferred by way of prayer, to the gods and goddeſſes of a beſieged town, to forſake it and come over to the Romans.

The form of evocation uſed at taking the city of Carthage is related by Macrob. Sat. III. 9. in the following words. *Si deus, ſi dea es, cui populus, civitaſque Carthaginienſis eſt in tutela, teque maxime ille, qui urbis hujus, populique tutelam recepiſti, precor, veneror que, veniamque a vobis peto, ut vos populum civitatemque Carthaginienſium deſeratis, loca, templa, ſacra, urbemque eorum relinquatis, abſque his abeatis: eique populo, civitatique metum, formidinem, oblivionem injiciatis, proditique Romam ad me meoſque veniatis; noſtraque vobis loca, templa, ſacra, urbs acceptior, probatiorque ſit: mihi quoque, populoque Romano, militibuſque meis prœpoſiti ſitis, ut ſciamus, intelligamuſque, &c. ſi ita feceritis, voveo vobis templa, ludoſque facturum.*

They always took it for granted that their prayer was heard, and that the gods had deſerted the place and came over to them, provided they were able to make themſelves maſters of it.

EVOCATORIÆ *epiſtolæ*, among the Romans, letters ſent by the emperors to command the attendance of any perſon; or letters granting licence to any one to wait on the emperor; every perſon not being allowed this privilege till they had deſired and obtained the *evocatoriæ epiſtolæ*.

EVOLUTE, EVOLUTA, in the higher geometry, a curve, which, by being gradually opened, deſcribes another curve. Such is the curve B C F; (plate XCIV. fig. 4.) for if a thread F C M be wrapped about, or applied to, the ſaid curve, and then unwound again, the point M thereof will deſcribe another curve A M M, called by Mr. Huygens, a curve deſcribed from evolution. The part of the thread, M C, is called the radius of the evolute, or of the oſculatory circle deſcribed on the center C with the radius M C.

Hence, 1. when the point B falls in A, the radius of the evolute M C is equal to the arch B C; but if not, to A B and the arch B C. 2. The radius of the evolute, C M, is perpendicular to the curve A M. 3. Becauſe the radius M C of the evolute continually touches it, it is evident from its generation, that it may be deſcribed through innumerable points, if the tangents in the parts of the evolute are produced until they become equal to their correſponding arches. 4. The evolute of the common parabola is a parabola of the ſecond kind, whoſe parameter is $\frac{27}{16}$, of the common one. 5. The evolute of a cycloid is another cycloid equal and ſimilar to it. 6. All the arches of evolute curves are rectifiable, if the radii of the evolute can be expreſſed geometrically. Thoſe who deſire a more particular account of theſe curves,

curves, may conſult Huygens's Horologium Oſcillatorium, Sir Iſaac Newton's and Mac-Laurin's Fluxion's, and Wolfius.

EVOLUTION, in algebra, the extraction of roots. See the article EXTRACTION.

EVOLUTION, in the art of war, the motion made by a body of troops, when they are obliged to change their form and diſpoſition, in order to preſerve a poſt, or occupy another, to attack an enemy with more advantage, or to be in a condition of defending themſelves the better.

It conſiſts in doublings, counter-marches, converſions, *&c.* A battalion doubles the ranks, when attacked in front or rear, to prevent its being flanked, or ſurrounded; for then a battalion fights with a larger front. The files are doubled either to accommodate themſelves to the neceſſity of a narrow ground, or to reſiſt an enemy which attacks them in flank; but if the ground will allow it, converſion is much preferable, becauſe after converſion the battalion is in its firſt form, and oppoſes the file leaders, which are generally the beſt men to the enemy; and likewiſe, becauſe doubling the files in a new, or not well diſciplined regiment, they may happen to fall into diſorder. See the article DOUBLING.

EUONYMUS, the SPINDLE-TREE, in botany, a genus of the tetrandria monogynia claſs of plants, the corolla whereof conſiſts of four ovated, plane, and patent petals, longer than the cup: the fruit is a ſucculent, coloured capſule, of a quadragonal figure, formed of four valves, terminating in four points, and forming four cells: the ſeeds are ſingle, of an oval figure, and covered with a calyptra. See plate XCIV. fig. 5.

The fruit of this plant provokes vomiting, is a ſtomachic, and purges by ſtool: however, it is dangerous, and ſhould be taken cautiouſly.

EVORA, or EBORA, a city of Portugal, ſeventy miles ſouth-eaſt of Liſbon. It is an archbiſhopric and univerſity, and is ſituated in one of the pleaſanteſt and moſt fruitful countries of that kingdom. See the article PORTUGAL.

EUPATORIUM, HEMP AGRIMONY, in botany, a genus of the ſyngeneſia-polygamia æqualis claſs of plants, the compound corolla of which is uniform and tubuloſe; the hermaphrodite flowers are equal; the partial flower is infundibuliform: the fruit is naked, only covered by the cup: the ſeeds are oblong, and crowned with a plumoſe down.

This plant is hepatic and vulnerary: but the principal uſe of it is in cachexies, catarrhs, and in ſuppreſſions of urine and the menſes: the root purges juſt in manner of the white hellebore.

EUPHEMIA, a port-town of the further Calabria, in Naples, fifty miles north-eaſt of Reggio.

EUPHEMISM, ευφημισμος, in rhetoric, a figure which expreſſes things in themſelves diſagreeable and ſhocking, in terms implying the contrary quality: thus, the Pontus, or Black Sea, having the epithet αξενος, i. e. inhoſpitable, given it, by reaſon of the ſavage cruelty of thoſe who inhabited the neighbouring countries, this name, by euphemiſm, was changed into that of Euxinus. Thus *Ovid Triſt. lib.* iii. *el.* 13.

Dum me terrarum pars pené noviſſima Ponti
Euxinus falſo nomine dictus habet.

And again, in *Triſt. lib.* v. *el.* 10.

Quem tenet Euxini mendax cognomine litus.

In which ſignifications, nobody will deny its being a ſpecies of irony: but every euphemiſm is not irony, for we ſometimes uſe improper and ſoft terms in the ſame ſenſe with the proper and harſh.

EUPHONY, ευφωνια, in grammar, an eaſineſs, ſmoothneſs, and elegance in pronunciation.

Euphony is properly a figure, whereby we ſuppreſs a letter that is too harſh, and convert it into a ſmoother, contrary to the ordinary rules: of this there are abundance of examples, in all languages.

EUPHORBIA, in botany a genus of the polyandria-monogynia claſs of plants, comprehending the tithymalus or ſpurge, the euphorbium properly ſo called, the tithymaloides, and the eſula of authors. The flower conſiſts of four or five petals, which are thick, gibbous, turbinated and truncated: the fruit is a roundiſh trilocular capſule, containing a ſingle roundiſh ſeed.

The euphorbium has a fleſhy or angular ſtalk, and the petals in ſome ſpecies are trifid; the tithymalus has leaves on the ſtalk, which the others have not; and the tithymaloides has the calyx gibbous on the under ſide. See the article EUPHORBIUM, *&c.*

EUPHORBIUM, in pharmacy, a gum

reſin brought us always in looſe ſmooth, and gloſſy gold-coloured drops or granules. It is the produce of the euphorbium antiquorum verum, which grows to ten or twelve feet high. Its principal uſe is externally in ſinapiſms, and plaſters applied to the feet, which are intended to ſtimulate, but not abſolutely to raiſe bliſters: for it is obſerved by Aviſenna, that when taken internally in large doſes, it has been found to exulcerate the inteſtines, and bring on death itſelf, after the moſt terrible ſymptoms.

EUPHRASIA, EYE-BRIGHT, in botany, a genus of the didynamia angioſpermia claſs of plants, the corolla of which conſiſts of a ſingle ringent petal; the tube is of the length of the cup; the upper lip is concave and emarginated; the lower one is patent, and divided into three ſegments: the fruit is an ovato-oblong, compreſſed capſule, forming two cells: the ſeeds are numerous, very ſmall, and of a roundiſh figure.

This plant is an ophthalmic and cephalic, and good for a weak memory.

EUPHRATES, the fineſt river in Turky in Aſia, has two ſources, northward of the city of Erzerum, in 40° north latitude. After paſſing through Armenia, it divides Syria from Diarbeck or Aſſyria, runs through Eyraca or Chaldea; and uniting with the Tygris, it paſſes by the city of Baſſora, fifty miles below which it falls into the gulph of Perſia.

EUREUX, a city of Normandy in France, capital of a territory of the ſame name, ſituated 25 miles ſouth of Rouen. Eaſt. long. 1° 12′. North lat. 49° 5′.

EURIPUS, a ſtrait between the iſland of Negropont, and the continent of Greece, remarkable for its irregular tides.

The term euripus is ſometimes uſed, in a more general ſenſe, for any ſtraits, where the water is much agitated.

EUROPE, the leaſt of the four grand diviſions of the earth, is ſituated between 36° and 72° north latitude; and between 10° degrees weſt longitude, and 65° eaſt longitude; being about 3000 miles long from north to ſouth, and 2500 miles broad from eaſt to weſt. It is bounded by the frozen ocean on the north, by Aſia on the eaſt, by the Mediterranean, which ſeparates it from Africa, on the ſouth, and by the Atlantic ocean on the weſt. Europe is commonly ſubdivided into three grand diviſions, north, middle, and ſouth. The north or upper diviſion comprehends Ruſſia or Muſcovy, Sweden, Denmark, and Norway, and the iſlands of Britain, Iceland, Greenland, and thoſe of the Baltic. The middle diviſion contains Poland, Germany, and the hereditary dominions of the houſe of Auſtria, the Low Countries, or Netherlands, and France. The ſouthern diviſion comprehends Turky in Europe, the antient Greece chiefly, Switzerland, Italy, Spain and Portugal, and the iſlands of Scily, Sardinia, Corſica, Majorca, Minorca, Ivica, and thoſe of the Archipelago. See the articles RUSSIA, SWEDEN, DENMARK, *&c.*

EURYTHMY, in architecture, painting, and ſculpture, is a certain majeſty, elegance, and eaſineſs, appearing in the compoſition of divers members, or parts of a body, painting or ſculpture, and reſulting from the fine proportion of it. Vitruvius ranks the eurythmia among the eſſential parts of architecture: he deſcribes it as conſiſting in the beauty of the conſtruction, or aſſemblage of the ſeveral parts of the work, which renders its aſpect, or its whole appearance, grateful; *e. gr.* when the height correſponds to the breadth, and the breadth to the length. Evelyn, in his account of architecture, ſays, that from theſe three ideas, or deſigns, *viz.* orthography, ſcenograghy, and profile, it is, that the ſame eurythmia, majeſtic and beautiful appearance of an edifice does reſult, which creates that agreeable harmony between the ſeveral dimenſions, *i. e.* between the length, breadth, and height of each room in a fabric, ſo that nothing ſeems diſproportional, too long for this, or too broad for that, but correſponds in a juſt and regular ſymmetry and conſent of all the parts with the whole.

EUSTATHIANS, the ſame with the catholics of Antioch, in the IVth century, ſo called from their refuſing to acknowledge any other biſhop beſide St. Euſtathius, who was depoſed by the Arians.

EUSTACE, or EUSTATIA, one of the Caribbee-iſlands, four miles weſt of St. Chriſtopher's, and ſubject to the Dutch.

EUSTYLE, in architecture, a ſort of building in which the pillars are placed at the moſt convenient diſtance one from another, the intercolumniations being juſt two diameters and a quarter of the column,

lumn, except thoſe in the middle of the face, before and behind, which are three diameters diſtant.

EUTYCHIANS, in church-hiſtory, heretics in the Vth century, who embraced the errors of the monk Eutyches, maintaining that there was only one nature in Jeſus Chriſt. The divine nature according to them, had ſo entirely ſwallowed up the human, that the latter could not be diſtinguiſhed; inſomuch, that Jeſus Chriſt was merely God, and had nothing of humanity but the appearance. This hereſy was condemned in a council held at Conſtantinople in 448, which ſentence was confirmed by the general council of Chalcedon, in 451.

EUXINE, the ſame with the Black-ſea. See the article BLACK-SEA.

EWE, the engliſh name of a female ſheep. See the article SHEEP.

EWRY, in the britiſh cuſtoms, an office in the king's houſhold, which has the care of the table-linen, of laying the cloth, and ſerving up water, in ſilver ewers, after dinner.

EXACTION, in law, a wrong done by an officer, or a perſon in pretended authority, in taking a reward or fee, that is not allowed by law.

A perſon guilty of exaction may be fined and impriſoned. It is often confounded with extortion. See EXTORTION.

EXACTOR REGIS, is ſometimes taken for the ſheriff, though more generally it denotes any perſon that collects the public monies, *&c.*

EXACUM, in botany a genus of the tetrandria-monogynia claſs of plants: the flower is monopetalous, patent, and divided into four ſegments at the limb; the fruit is a bilocular capſule, marked with two deep furrows, opening at the top, and containing numerous ſeeds.

EXÆRESIS, in ſurgery, the operation of extracting or taking away ſomething that is hurtful to the human body.

EXAGGERATION, in rethoric, a kind of hyperbole, whereby things are augmented or amplified, by ſaying more than the truth, either as to good or bad.

There are two kinds of exaggeration, the one of things, the other of words. The firſt is produced, 1. By a multitude of definitions. 2. By a multitude of adjuncts. 3. By a detail of cauſes and effects. 4. By an enumeration of conſequences. 5. By compariſons. And, 6. By the contraſt of epithets and rational inference.

Exaggeration by words is effected, 1. By uſing metaphors. 2. By hyperboles. 3. By ſynonymous terms. 4. By a collection of ſplendid and magnificent expreſſions. 5. By periphraſis. 6. By repetition. And, laſtly, by confirmation with an oath; as for example, *Parietes, medius fidius, gratias tibi agere geſtiunt.* See METAPHOR and HYPERBOLE.

EXAGGERATION, in painting, a method by which the artiſt, in repreſenting things, charges them too much, or makes them too ſtrong, either in reſpect of the deſign or the colouring. It differs from caricaturing, in that the latter perverts or gives a turn to the features of a face, *&c.* which they had not; whereas exaggeration only heightens or improves what they had.

EXALTATION, elevation, in a figurative ſenſe, is applied to denote the inauguration, coronation, *&c.* of the pope. See the articles INAUGURATION, *&c.*

EXALTATION *of the croſs*, in church-hiſtory. See the article CROSS.

EXALTATION, in aſtrology, is a dignity which a planet acquires in certain ſigns or parts of the zodiac, which dignity is ſuppoſed to give it an extraordinary efficacy and influence. Thus the 15° of cancer is the exaltation of jupiter, according to Albumazar; that of the ſun is the 19° of aries, and that of the moon is in taurus.

EXALTATION, in chemiſtry, ſignifies an operation by which a ſubſtance has its properties changed and raiſed to a higher degree of dignity and virtue.

There are two kinds of exaltation: 1. Maturation, which is nothing but the raiſing and promoting a thing from a crude to a mature and perfect ſtate. And, 2. Gradation.

EXAMINATION, an exact and ſcrupulous diſquiſition or enquiry, in order to find out the truth of any thing.

Self-**EXAMINATION**, by way of preparation to repentance, is reduced by divines to five points: 1. A returning thanks to God for his benefits. 2. A begging of grace and light, to know and diſtinguiſh our ſins. 3. An enquiry into all our words, thoughts, and actions, in order to learn what has been offenſive to God. 4. A begging of pardon, and conceiving a ſincere ſorrow for having diſpleaſed him. 5. Making a firm reſolution not to offend him any more; and taking the neceſſary precautions to preſerve ourſelves from it.

EXAMINERS, in chancery, two officers of that court, who examine, upon oath, witneſſes produced in cauſes depending there, by either the complainant or defendant, where the witneſſes live in London, or near it. Sometimes parties themſelves, by particular order, are examined. In the country, above twenty miles from London, on the parties joining in commiſſion, witneſſes are examined by commiſſioners, being uſually counſellors or attornies, not concerned in the cauſe. See the article CHANCERY.

EXAMPLE, in rhetoric, is a way of reaſoning, by which a particular fact is produced, or cleared up, by another that is ſimilar to it.

EXANNUAL ROLL, that wherein, according to the old way of exhibiting ſheriffs accounts, the illeviable fines and deſperate debts were tranſcribed.

This roll was yearly read over to the ſheriffs, to ſee what might be gotten thereby.

EXANTHEMA, εξανθημα among phyſicians, denotes any kind of efflореſcence or eruption, as the meaſles, purple ſpots in the plague, or malignant fevers, *&c.*

EXARCH, εξαρχος, in antiquity, an officer ſent by the emperors of the eaſt, into Italy, in quality of vicar, or rather præfect, to defend that part of Italy which was yet under their obedience, and particularly the city of Ravenna, againſt the Lombards. The exarch reſided at Ravenna, which place, with Rome, was all that was left to the emperors, of their italian dominions. The firſt exarch was under Juſtin the younger, in the year 567, after Beliſarius and Narſes had driven the barbarians out of Italy. The laſt was Eutychius, defeated by Adolphus king of the Lombards, in 752. But Pepin, king of France, deprived him of the exarchate, and made a gift of it to the pope, ordering his chaplain to lay the keys of all the towns on the altar of St. Peter and Paul at Rome.

EXARCH *of a dioceſe* was the ſame with primate. See the article PRIMATE.

EXARCH alſo denotes an officer ſtill ſubſiſting in the greek church, being a kind of viſitor, or one deputed by the patriarch into provinces, to ſee whether the biſhops do their duty, and whether the reſt of the clergy obſerve the canons of the church.

There is another officer alſo of this name under the patriarchs of the greek church, who has the care and inſpection of the patriarchal monaſteries, or ſuch as depend immediately on the patriarch.

EXARCHOS is a name given by Homer, Philo, and other antient writers, for the choragus, or he who ſung firſt in the antient chorus. See the articles CHORAGUS and CHORUS.

EXARTICULATION, in ſurgery. See the article LUXATION.

EXAUCTORATION, *exauctoratio*, in roman antiquity, correſponded, in ſome meaſure, to our keeping ſoldiers or ſailors in half-pay; but differed in this, that the exauctorati milites were deprived of their pay and arms, without being abſolutely diſcharged. Sometimes, indeed, it ſignifies a full, but ignominious diſcharge.

EXCALCEATION, among the Hebrews, was a particular law, whereby a widow, whom her huſband's brother refuſed to marry, had a right to ſummon him to a court of juſtice, and, upon his refuſal, might excalceat him, that is, pull off one of his ſhoes, and ſpit in his face; both of them actions of great ignominy.

EXCAMBIATORS, in our old cuſtoms, perſons employed in exchanging lands, much the ſame as our brokers are between merchants. See the article BROKER.

EXCELLENCY, a title antiently given to kings and emperors, but now to embaſſadors, and other perſons, who are not qualified for that of *highneſs*, and yet are to be elevated above the other inferior dignities.

In England and France the title is now peculiar to embaſſadors, but very common in Germany and Italy. Thoſe it was firſt appropriated to, were the princes of the blood of the ſeveral royal houſes; but they quitted it for that of *highneſs*, upon ſeveral great lords aſſuming excellency. The embaſſadors have only bore it ſince the year 1593, when the pope complimented the duke de Nevers, embaſſador from Henry IV. of France, with the title of excellency; and though it was on account of his birth, and not of his character, yet the embaſſadors of all nations have ever ſince claimed the ſame appellation.

The embaſſadors of Venice have only had the title of excellency ſince the year 1636, when the emperor and king of Spain conſented to allow it to them. The court of Rome never allows that title to any embaſſador who is a churchman, as judging it a ſecular title.

The embaſſadors of France at Rome, antiently gave the title of excellency to all the relations of the pope then reigning, and to ſeveral other noblemen; but now they are more reſerved in that reſpect; though they ſtill treat all the roman princes with excellency: on the other hand, the court of Rome beſtows the ſame title on the chancellor, miniſters, and ſecretaries of ſtate, and preſidents of the ſovereign courts of France, the preſidents of the councils in Spain, and the chancellor of Poland, if they are not eccleſiaſtics.

EXCENTRIC, in geometry, a term applied to circles and ſpheres which have not the ſame center, and conſequently are not parallel; in oppoſition to concentric, where they are parallel, having one common center.

EXCENTRIC *circle*, in the ptolemaic ſyſtem, the very orbit of the planet itſelf, which it was ſuppoſed to deſcribe about the earth. It was alſo called the deferent. See the article DEFERENT.

EXCENTRIC *circle*, in the new aſtronomy, a circle deſcribed from the center of the orbit of the planet, with half the axis as a radius.

EXCENTRIC *equation*, in the old aſtronomy, is an angle made by a line drawn from the center of the earth, and another drawn from the center of the excentric to the body or place of any planet, the ſame with the proſtaphæreſis; and is equal to the difference (accounted in an arch of the ecliptic) between the ſun's or planet's real and apparent place.

EXCENTRIC *place of a planet*, is the very point of the orbit, where the circle of inclination coming from the place of a planet in its orbit, falls thereon with right angles.

Anomaly of the **EXCENTRIC**. See the article ANOMALY.

EXCENTRICITY, in the old aſtronomy, is the diſtance of the center of the orbit of a planet from the center of the earth.

It is generally allowed that ſaturn, jupiter, mars, venus, and mercury, have ſuch an excentricity, becauſe they appear to us of different magnitudes at different times, which could only proceed from hence that their orbits being excentric to the earth, in ſome parts thereof they are nearer us, and in others more remote. But ſome diſpute has been made about the excentricities of the ſun and moon. Many people maintain that the ſun and moon appear ſometimes larger, and ſometimes leſs; not that they are nearer us at one time than at another, but becauſe they are viewed through different columns of air, which producing a difference in the refraction of their light, may occaſion thoſe different appearances. Others again take the excentricities of the ſun and moon to be ſufficiently proved, both from eclipſes, from the moon's greater and leſs parallax at the ſame diſtance from the zenith, and from the ſun's being obſerved to continue longer in the northern than in the ſouthern hemiſphere.

EXCENTRICITY, in the new aſtronomy, is the diſtance of the center of the orbit of a planet from the center of the ſun, that is, the diſtance between the center of the ellipſis and the focus thereof.

It is alſo called ſimple or ſingle excentricity.

To find the **EXCENTRICITY** *of the earth's orbit, and the place of the apſides.* Take an obſervation of mars when he is in oppoſition with the ſun, and then, if mars be in M (plate XCIV. fig. 3.) the ſun in S, and the earth in T, they will be all in the ſame right line M T S. When mars, after 687 days, returns again to the ſame point M, and the earth not reaching the ſame till after 730½ days, in which time ſhe completes two revolutions in her orbit, is found in the point A, obſerve the place of the ſun ſeen from the earth by the right line A S, and the place of mars ſeen by the right line A M. We have, therefore, by means of the ſun's place in E, at the time of the ſecond obſervation, and his place in F, at the time of the firſt obſervation, the angle E S F given, to which the angle M S A is equal. And by knowing the place of the ſun and mars in the ſecond obſervation, we have the diſtance of mars from the ſun, or the angle M A S. In the ſame manner may be found the angle M S B, and B S the diſtance of the earth from the ſun in decimal parts of M S, when mars returns a ſecond time to M, and likewiſe the angle M S C, and the right line S C, when mars returns a third time to M. Wherefore ſince the focus of the earth's orbit is in S, and A, B, and C are points in that orbit, the line of the apſides will be determined, the orbit will be deſcribed, and conſequently the excentricity will be known. The excentricity of all the primary planets, and the poſition of the line of apſides may be found in the ſame manner, if three heliocentric places of the planet, together with its true diſtance from the ſun are known. But it muſt be obſerved, that we ſuppoſe that the planet, in the ſame point of its orbit, has the ſame diſtance from the ſun, which we may eaſily ſuppoſe on account of the ſlowneſs of the motion of the aphelia.

The excentricities of the ſeveral orbits of the planets are as follow; ſuppoſing the diſtance of the earth from the ſun, 1000 equal parts:

The excentricity of mercury's orbit is about	80	of ſuch parts.
Venus's	5	
The earth's	17	
Mars's	141	
Jupiter's	250	
Saturn's	247	

The excentricity of the moon's orbit is about 3,3 of the ſemi diameter of the earth, and now and then it grows greater and now and then it diminiſhes. It is greateſt when the line of the apſides is coincident with the ſyzygia, or is in the line which joins the centers of the ſun and earth. And the excentricity is leaſt when the line of the apſides cuts the other at right angles. The difference between the greateſt and leaſt excentricity is ſo conſiderable, that it exceeds the half of the leaſt excentricity.

Double **EXCENTRICITY**, is the diſtance between the two foci in the ellipſis, which is equal to twice the ſingle excentricity.

EXCEPTION, in law, denotes a ſtop or ſtay to an action, and is either dilatory or peremptory, in proceedings at common law: but in chancery it is what the plaintiff alledges againſt the ſufficiency of an anſwer, &c.

An exception is no more than the denial of what is taken to be good by the other party, either in point of law, or pleading. The council in a cauſe are to take all their exceptions to the record at one time, and before the court has delivered any opinion of it.

EXCEPTION *to evidence*, is where a demurrer is offered in any civil cauſe, for the inſufficiency of the evidence given, and the court does not agree to it; in ſuch caſe, the court, upon requeſt, is to ſeal a bill of exceptions to the evidence, which may be heard on a writ of error. A plaintiff or defendant may alſo alledge any exception to the judge's opinion, praying the ſame to be allowed; and if the judge refuſes it, then the party concerned is to write it down, and, when ſigned by council, require the judge to ſeal the ſame, to be heard afterwards.

EXCEPTIONS *in deeds and writings*, is the ſaving a particular thing out of a general one granted by deed, as a room, ſhop, or cellar cut of a houſe; a field, or timber trees, out of land, &c.

Exceptions of this kind muſt be ſomething ſerviceable, and if they croſs the grant, or are repugnant thereto, they are void of courſe. Yet there may be a kind of exception, or ſaving out of an exception, ſo as to make a thing as if never excepted; as where a leaſe is made of a rectory, excepting the parſonage-houſe, ſaving to the leſſee a chamber, this ſhall paſs by the leaſe.

EPCEPTIVE, ſomething that contains exceptions; ſuch are exceptive propoſitions. See the article PROPOSITION.

EXCESS, in arithmetic and geometry, is the difference between any two unequal numbers or quantities, or that which is left after the leſſer is taken from or out of the greater. See SUBTRACTION.

EXCHANGE, in a general ſenſe, a contract, or agreement, whereby one thing is given or exchanged for another. See the article BARTERING.

EXCHANGE, in commerce, implies the trade of money, carried on between one place and another, by means of bills of exchange. See the article BILL.

The original traffic of mankind becoming troubleſome, neceſſity led them to the invention of ſome more eaſy manner of continuing their commerce, for which end money was thought the moſt commodious medium, and conſequently this was, many ages ſince, adopted to carry on their trade; and ſtill, for a greater convenience of foreign trade, they not only made coins of the moſt valuable metals, but by degrees, fell into an improvement even of this, and ſubſtituted remittances and exchange, by bills, to ſave the expence and riſque which the portage of money from one kingdom to another occaſioned.

But as commerce varied, ſo did exchange too, though long ago they were generally reduced in Europe into four, *viz.* cambio commune, cambio real, cambio ſicco, and cambio fictitio.

Cambio commune, in England, was that which was conſtituted by the ſeveral kings, who, having received monies in England, would remit the like ſum by exchange, to be paid in another kingdom, according to the value of the different coins current in theſe countries. Cambio real was when monies were paid to the exchanger, and bills were drawn without naming the ſpecies, but according to the value of the ſeveral coins; and was no more than the payment of money in England, with a proviſo to be paid the juſt value in ſpecie, in another country, according to the price agreed on between the exchanger and deliverer, to allow or pay for the exchange of the money and the loſs of time. Cambio ſicco, or dry exchange, is when a merchant has occaſion for 500 l. for a certain time, and would pay intereſt for it; but the lender, being deſirous to take more than the ſtatute allows, and yet willing to avoid its penalty, offers the 500 l. by exchange for Cadiz, to which the merchant agrees; but having no correſpondent there, the lender deſires him to draw his bill on the ſaid place, payable at double or triple uſance, by any feigned perſon, as the exchange ſhall then govern, with which the merchant complies; and on receipt of the bill, the banker pays the money and remits the bill to ſome friend at Cadiz, which with the exchange and intereſt, the merchant is to pay his creditor: theſe expences formerly were very conſiderable. Cambio ficitio is when a merchant hath occaſion for goods, but cannot ſpare money for their payment; and the owner of them, to ſecure his advantage, and avoid the penalty of the law, acts as the uſurer in the former caſe, and obliges the buyer to defray the expences of re-exchange, *&c.*

The juſt and true exchange for monies, that is at this day uſed both in England and other countries, by bills, is *par pro pari*, or value for value. Thus the engliſh exchange is grounded on the weight and fineneſs of our own money, and the weight and fineneſs of thoſe of each other country, according to their ſeveral ſtandards, and proportionable to their valuations, which being truly and juſtly made, aſcertains and reduces the price of exchange for a ſum certain for the exchange of monies to any country whatever. As money is the common meaſure of things between man and man within the realm, ſo is exchange between merchant and merchant both within and without the realm; the which is properly made by bills, when money is delivered ſimply here in England, and bills received for the repayment of the ſame in ſome other country, either within or without the realm, at a price certain, agreed on between the merchant and the deliverer; for there is not at this day any peculiar or proper money to be found in ſpecie, whereon outland exchanges can be grounded; therefore, all foreign coins are called imaginary.

As the monies and ſpecies of almoſt every nation differ not only in their current prices, but alſo in their intrinſic value, there is a juſt and certain par eſtabliſhed between them, according to the real and effective worth of each ſpecies, without any regard to their currency in the countries where they are coined; and the par is, by ſome authors, ſuppoſed to be of two ſorts, *viz.* the one of real monies, the other of exchanges, or imaginary ſpecies, though both ſeem to be the ſame thing, as having a neceſſary dependance on each other. See the article Par.

The relative abundance and ſcarcity of ſpecie in different countries, form what is called the courſe of exchange. This ſcarcity or plenty, from whence reſults the mutability of the courſe of exchange, is not the real, but a relative ſcarcity or plenty; for example, when France has greater occaſion for funds in Holland, than the Dutch of having funds in France, ſpecie is ſaid to be common in France, and ſcarce in Holland; and *vice verſa.* See Ballance *of trade.*

In order to judge of the ſcarcity or plenty of ſpecie, we muſt know, for example, that if there are more bills from Holland than there are from France, then ſpecie is ſcarce in France, and common in Holland: it then becomes neceſſary that the exchange ſhould riſe, and the Dutch give more for ſpecie of the ſame value in France, than the French for that of an equivalent value in Holland. When money of the ſame ſtandard and weight in France, yields money of the ſame ſtandard and weight in Holland, it is ſaid that the exchange is at par. In the actual ſtate of ſpecie, which was in 1744, the par was nearly at 54 groſs to the French crown of three livres. When the exchange is above 54 groſs, the French ſay it is high; when beneath, they ſay it is low.

In order to know the loſs and gain of a ſtate in a particular ſituation of exchange, it muſt be conſidered as debtor and creditor, as buyer and ſeller. When the exchange is below par, it loſes as debtor, and gains as creditor; it loſes as buyer, and grains as ſeller. It is obvious it loſes as debtor. Suppoſe, for example, France owes Holland a certain number of gros, the greater number of gros there are in a crown, the more crowns ſhe has to pay. On the contrary, if France is creditor for a certain a certain number of gros, the leſs number of gros there are in a crown, the more crowns ſhe will receive. The ſtate loſes alſo as a buyer; for there muſt be the ſame number of gros to buy the ſame quantity of merchandiſe; and while the exchange is low, every french crown is worth fewer gros: for the ſame reaſon, the ſtate gains as ſeller: you ſell your merchandiſe in Holland for a certain number of gros: you receive then more french crowns, when for every fifty gros you receive a crown, then you would do if you received the ſame crown for every 54. The contrary to this takes place in the other ſtate. If the Dutch are indebted a certain number of crowns to France, they will gain; if they are owing to them, they will loſe; if they ſell, they loſe; if they buy, they gain.

Again, when the exchange between France and Holland is below par; for example, if it ſhould be at 50 inſtead of 54, it ſhould follow, that France, on ſending bills of exchange to Holland for 54,000, could buy merchandiſes only to the value of 50,000; and that, on the other hand, the Dutch ſending the value of 50,000 to France, might buy 50,000 crowns, which makes a difference of $\frac{8}{64}$, that is, a loſs of more than $\frac{1}{7}$; ſo that France would be obliged to ſend to Holland $\frac{1}{7}$ more in ſpecie or merchandiſe, than ſhe would do was the exchange at par; and as the miſchief muſt conſequently increaſe, becauſe a debt of this kind would bring the exchange ſtill lower, France would in the end be ruined.

It ſeems, we ſay, as if this ſhould certainly follow; and yet it does not, becauſe ſtates conſequently lean towards a ballance, in order to preſerve their independency. Thus they borrow only in proportion to their ability to pay, and meaſure their buying by what they ſell; and taking the example from what has been ſaid, if the exchange happens to fall in France from 54 to 50, the Dutch, who buy merchandiſes in France to the value of a thouſand crowns, for which they uſed to pay 54,000 gros, would now only pay 50,000, if the French would conſent to it. But the merchandiſe of France will riſe inſenſibly, and the profit will be ſhared between the French and the Dutch; for when a merchant can gain, he eaſily ſhares his profit: there then ariſes a communication of profit between the French and the Dutch.

In the ſame manner, the French who bought merchandiſes of Holland for 54,000 gros, and who, when the exchange was at 54, paid for them 1000 crowns, will be obliged to add $\frac{4}{54}$ more in french crowns, to buy the ſame merchandiſes. But the french merchant, being ſenſible of the loſs he ſuffers, will take up leſs of the merchandiſe of Holland: the french and the dutch merchant will then be both loſers, the ſtate will inſenſibly fall into a ballance, and the lowering of the exchange will not be attended with theſe inconveniencies we had reaſon to fear.

A merchant may ſend his ſtock into a foreign country, when the exchange is below par, without injuring his fortune, becauſe when it returns, he recovers what he had loſt; but a prince, who ſends only ſpecie into a foreign country, which can never return, is always a loſer.

When the merchants have great dealings in any country, the exchange there infallibly riſes. This proceeds from their entering into many engagements, buying great quantities of merchandiſes, and drawing upon foreign countries to pay for them.

A prince may amaſs great wealth in his dominions, and yet ſpecie may be really ſcarce, and relatively common: for inſtance, a ſtate is indebted for many merchandiſes to a foreign country, the exchange will be low, though ſpecie be ſcarce.

The exchange of all places conſtantly tends to a certain proportion, and that in the very nature of things. If the courſe of exchange from Ireland to England is below par, that of Ireland to Holland will be ſtill lower: that is, in a compound ratio of that of Ireland to England, and that of England to Holland: for a dutch merchant, who can have his ſpecie indirectly from Ireland, by the way of England, will not chooſe to pay dearer, by having it the direct way.

This, we ſay, ought naturally to be the caſe; but, however, it is not exactly ſo: there are always circumſtances which vary theſe things; and the different profit of drawing by one place, or of drawing by another, conſtitutes the particular art and dexterity of the foreign bankers. See the article BANKER.

This is what in a great meaſure conſtitutes what is called arbitration in exchanges, which is defined to be a truck, which two bankers mutually make of their bills upon different parts, at a conditional price, and courſe of exchange. This is the moſt beneficial, as well as the moſt delicate branch of exchange to be thoroughly informed of.

1. Before any one applies himſelf to the ſtudy of this ſubject; it is neceſſary that he ſhould be well ſkilled in the practical operations, in regard to the reducing of the ſterling money of England into the foreign monies of exchange and of account of all places throughout Europe, acording to the direct courſes of exchange eſtabliſhed for theſe purpoſes, and *vice verſa*.

2. That he ſhould be acquainted with the methods of converting ſterling money into the monies of exchange and of account of all other places of commerce, wherewith England has no direct eſtabliſhed courſes of exchange, but is under the neceſſity of making uſe of the intermediate exchanges of other places; together with the nature of the agios, and the manner of converting their bank monies into current, and the reverſe. See the article AGIO.

3. The manner of calculating all the foreign monies of Europe into thoſe of every other diſtinct country, either according to the direct or intermediate exchange, which makes a much greater variety of caſes than thoſe who are not acquainted with this extenſive ſubject can imagine.

4. It is neceſſary alſo to know the intrinſic value of foreign monies, according to the moſt accurate aſſays which have been made for that purpoſe; and this the reader will find done to his hand under the article coin. See COIN.

5. Laſtly, it is requiſite to underſtand the general natural cauſes of the riſe and fall of the courſes of exchange between nation and nation, or between one trading city and another in the ſame nation; which depends upon the ballance of trade being either in favour of, or againſt a nation or trading city.

Another method of conſidering the arbitration of exchanges, is founded upon comparing the various occaſional prices of exchange between nation and nation, in order to diſcover at all times, whether certain courſes continue in an equality of proportion, or how far they deviate therefrom; by which means the advantage to be made by ſuch a compariſon of exchanges may be exactly aſcertained, for the government of the merchant or remitter, to take his meaſures accordingly, and not to let the advantageous occaſion eſcape his cognizance. And this muſt neceſſarily prove the caſe, provided a perſon is not accompliſhed in this branch of the exchanges; and here it will be proper to obſerve, that in a compariſon or combination of the courſes of exchange of ſeveral places together, it is rare that they happen to ebb and flow in an exact equality of proportion; the reaſon whereof muſt be obvious to every one who conſiders, that the ballance of trade differs between different nations; which being the caſe, the judgment of the exchange-negotiator conſiſts in vigilantly obſerving, from a due compariſon of the courſes, where the greateſt inequality of proportion lies: for there lies the greateſt profit to be made, by drawing and remitting to certain places preferably to others.

But the greateſt profit to be made this way, does not always happen to ariſe from a compariſon of theſe courſes only, where the general currency of a trader's buſineſs lies: on the contrary, from the nature and circumſtances of the trade of ſuch countries, the riſe and fall of the courſes may generally continue in ſuch an equality of proportion, as only occaſionally, or ſeldom, to admit of any extra profit by the exchange. When the exchange is lower than the ſpecie of a country, a profit may be made by ſending it abroad; when it is higher than the ſpecie, there is a profit in cauſing it to return: but there is a caſe in which profit may be made by ſending the ſpecie out of the kingdom, when the exchange is at par; that is, by ſending it into a foreign country, to be coined over again. When it returns, an advantage may be made of it, whether it be circulated in the country, or paid for foreign bills.

EXCHANGE ſignifies alſo a place in moſt conſiderable trading cities, wherein the merchants, negociants, agents, bankers, brokers, interpreters, and other perſons concerned in commerce, meet on certain days, and at certain times thereof, to confer and treat together of matters relating to exchanges, remittances, payments, adventures, aſſurances, freightments, and other mercantile negociations, both by ſea and land.

Theſe aſſemblies are held with ſo much exactneſs, that the abſence of a merchant, *&c.* makes him ſuſpected of drawing to a failure of bankruptcy, as not being able to ſtand the change.

The moſt conſiderable exchanges in Europe, are thoſe of Amſterdam, and that of London, called the royal-exchange. See the article ROYAL-EXCHANGE.

EXCHANGE, in law, ſignifies a mutual grant of lands or tenements, the one in exchange for the other.

This word, in our law, is peculiarly uſed for that compenſation which the warrantor muſt make to the warrantee, value for value, in caſe the land warranted be taken, or recovered from the warrantee. Exchanges are made of lands in fee, tail, or for term of life, *&c.* where a perſon is ſeiſed of certain lands or tenements, and another is ſeiſed of other lands, *&c.* thoſe two perſons may exchange their lands, ſo that each of them ſhall have the other's lands ſo exchanged. But in this exchange the eſtates granted muſt be equal; for ſhould one have an eſtate in fee in his land, and the other an eſtate in the other land only for term of life, or in tail, ſuch exchange is void, on account of the unequality; though, if the eſtates are equal, as eſtate in fee for another in fee, tail for tail, *&c.* the exchange will be good, if the lands be not of equal value.

EXCHANGERS, are ſuch as return money by bills of exchange. See the articles BILL and EXCHANGE.

EXCHEQUER, in the britiſh juriſprudence, an antient court of record, in which all cauſes concerning the revenues and rights of the crown are heard and determined, and where the crown-revenues are received. It took this name from the cloth that covered the table of the court, which was party-coloured or chequered.

This court is ſaid to have been erected by William the conqueror, its model being taken from a like court eſtabliſhed in Normandy long before that time. Antiently its authority was ſo great, that it was held in the king's palace, and the acts thereof were not be examined or controlled in any other of the king's courts; but, at preſent, it is the laſt of the four courts at Weſtminſter.

In the exchequer, ſome reckon ſeven courts, *viz.* thoſe of pleas, accounts, receipts, exchequer-chamber, (which is an aſſembly of all the judges on difficult matters in law) errors in the exchequer, errors in the king's bench, and, laſtly, the court of equity in the exchequer.

But the exchequer, for diſpatch of buſineſs, is generally divided into two parts; one of which is chiefly converſant in the judicial hearing and deciding of all cauſes relating to the king's coffers, formerly termed the exchequer of accounts: the other is called the receipt of the exchequer, as being principally employed in receiving and payment of money.

Officers of the receipt may take one penny in the pound, as their fee for ſums iſſued out; and they are obliged, without delay, to receive the money brought thither; and the money received is to be put in cheſts under three different locks and keys, kept by three ſeveral officers. All ſheriffs, bailiffs, *&c.* are to account in the exchequer; and in the lower part, termed the receipt, the debtors of the king, and perſons in debt to them, the king's tenants, and the officers and miniſters of the court, are privileged to ſue one another, or any ſtranger, and to be ſued in the like actions as are brought in the courts of king's bench and common-pleas.

The judicial part of the exchequer, is a court both of law and equity. The court of law is held in the office of pleas, according to the courſe of common law, before the barons: in this court, the plaintiff ought to be debtor or accountant to the king; and the leading proceſs is either a writ of ſubpœna, or quo minus, which laſt goes into Wales, where no proceſs out of our courts of law ought to run, except a capias utlagatum.

The court of equity is held in the exchequer-chamber before the treaſurer, chancellor, and barons; but, generally, before the barons only; the lord chief baron being the chief judge to hear and determine all cauſes. The proceedings in this part of the exchequer, are by engliſh bill and anſwer, according to the practice of the court of chancery; with this difference, that the plaintiff here muſt likewiſe ſet forth that he is a debtor to the king, whether he be ſo or not. It is in this court of equity that the clergy exhibit bills for the recovery of their tythes, *&c.* Here too the attorney-general exhibits bills for any matters concerning the crown; and a bill may be exhibited againſt the king's attorney by any perſon aggrieved in any cauſe proſecuted againſt him on behalf of the king, to be relieved therein: in which caſe, the plaintiff is to attend on the attorney-general with a copy of the bill, and procure him to give in an anſwer thereto; in the making of which he may call in any perſon intereſted in the cauſe, or any officer, or others, to inſtruct him, that the king be not prejudiced thereby, and his anſwer is to be put in without oath.

But beſides the buſineſs relating to debtors, farmers, receivers, accountants, &c. all penal puniſhments, intruſion, and forfeitures upon popular actions, are matters likewiſe cognizable by this court; where there alſo ſits a puiſne baron, who adminiſters the oaths to high ſheriffs, bailiffs, auditors, receivers, collectors, controllers, ſurveyors and ſearchers of all the cuſtoms, &c. See the articles BARON, CHANCELLOR, &c.

The exchequer in Scotland, has the ſame privileges and juriſdiction as that of England; and all matters competent to the one, are likewiſe competent to the other.

Black book of the EXCHEQUER, a book containing a deſcription of the court of England in 1175, and its officers, with their ranks, wages, privileges, perquiſites, &c. alſo the revenues of the crown, both in money and cattle.

EXCIPIENT, in pharmacy, denotes the ingredient, which, in compound medicines, receives all the reſt; as the conſerve in electuaries, the ſyrup in boluſes, &c.

EXCISE, a certain duty or impoſt charged upon liquors, as beer, ale, cyder, &c. malt, and ſeveral other commodities, within the kingdom of Great Britain, and town of Berwick upon Tweed.

The exciſe is one of the moſt conſiderable branches of the king's revenue. It was formerly farmed out, but is now managed for the king by commiſſioners in both kingdoms, who receive the whole product of the exciſe, and pay it into the exchequer. Theſe commiſſioners are nine in number in England, and four in Scotland. The former have a ſalary of 1000 l. a year, the latter, 500 l. They are obliged by oath to take no fee or reward but from the king himſelf; and from thence them lies an appeal to five other commiſſioners, called commiſſioners of appeals. The duty of exciſe was firſt granted to king Charles II. by act of parliament in the year 1660, during the life of that monarch. 1. It was 15 d. *per* barrel upon every barrel of beer or ale above 6 s. the barrel, and 3 d. *per* barrel for every barrel of 6 s. or under, brewed for retail; 15 d. for every hogſhead of cyder or perry ſold by retail, 1 d. for every gallon of ſtrong water, aqua vitæ, &c. 2. A new exciſe was granted for ever by the fifth money act of Will. and Mary, being for every barrel of beer or ale above 6 s. the barrel, 9 d. and for every barrel of 6 s. or under, 3 d. for every hogſhead of cyder or perry, 1 s. *per* hogſhead. In this exciſe, the price of the liquor is to be reckoned excluſive of the duty. 3. An exciſe was granted of 6 d. a buſhel on malt in the reign of king William, which by ſubſequent ſtatutes has been continued yearly ever ſince. But ſuch malt as ſhall be made for exportation, and be ſo entered and kept ſeparate from other malt, is exempted from the payment of this duty. 4. Another new exciſe upon home-made liquors was granted in queen Anne's reign; being an additional exciſe upon every barrel of beer or ale brewed for ſale above 6 s. the barrel, 3 d. excluſive of the duties; and for every barrel at 6 s. or under, 1 d. for every hogſhead of cyder or perry, 5 d. for every gallon of ſtrong waters or aqua vitæ, 1 d. This exciſe was not laid upon any ſuch liquors imported. 5. An exciſe on candles was firſt granted in the reign of queen Anne, and continued for ever, being a duty of 4 d. a pound on wax and a halfpenny the pound on tallow-candles, made in Great Britain for ſale or not for ſale; but makers for their own uſe may compound for 1 s. a head for every perſon in their family. An additional exciſe on candles was afterwards granted, being the ſame with the former in every reſpect. 6. An exciſe upon hides and ſkins tanned in Britain, firſt granted in queen Anne's reign, was an exciſe of ſeventeen different kinds, upon ſo many different kinds of hides and ſkins particularly named, and upon all others not named, 13 l. *per cent. ad valorem*. An additional exciſe was afterwards granted, being an additional duty of different kinds, upon ſo many different ſorts of hides and ſkins particularly named, and on all others not named, 15 l. *per cent.* on the value. 7. An exciſe on home-made vellum and parchment, firſt granted by the ſame act, being 1 s. *per* dozen on vellum, and 6 d. the dozen on parchment. And afterwards an additional exciſe on vellum, &c. was granted, being an additional duty of 2 s. the dozen on vellum, and 1 s. the dozen on parchment. 8. An exciſe on hops of home growth was firſt granted in queen Anne's reign, being 1 d. *per* pound. 9. An exciſe on paper, paſte-boards, milled boards, and ſcale-boards, was firſt granted in the reign of queen Anne, being a duty of eleven different kinds on ſo many different ſorts of paper particularly named, made in Great Britain; on paſte-boards, *&c.* 3 s. the hundred weight, and on all ſorts of paper not named, 12 l. *per cent.* on the value. An additional duty on paper, *&c.* was granted of eleven different kinds, *&c.* on paſte-board, 1 s. 6 d. the hundred weight, and on all ſorts of paper not named, 6 l. *per cent.* on the value; and on painted paper for hangings a halfpenny the yard ſquare. 10. An exciſe of 1 d. *per* pound on ſoap made in Great Britain, was granted by the ſame act; to which an additional exciſe has been added of a halfpenny *per* pound. 11. An exciſe upon printed ſilks, callicoes, linens and ſtuffs made in Great Britain, and printed, painted, ſtained or dyed here, was firſt granted in queen Anne's reign, being a duty of 3 d. on ſilks and callicoes, and $1\frac{1}{2}$ d. on linen and ſtuffs the yard ſquare, excepting ſilk-handkerchiefs, linens and fuſtains dyed of one colour, and ſtuffs made of woollen, or the greateſt part in value of woollen. And an additional exciſe was granted of 6 d. the yard of half-yard broad ſilks; 1 d. the yard ſquare of ſilk handkerchiefs; 3 d. the yard ſquare of callicoes, and $1\frac{1}{2}$d. the yard ſquare of linens and ſtuffs, excepting, as before, callicoes, *&c.* dyed of one colour, and woollen ſtuffs. 12. An exciſe on ſtarch was firſt granted for 1 d. the pound; and afterwards an additional exciſe of 1 d. the pound. 13. The exciſe on gilt and ſilver wire made in Great Britain, is 8 d. the ounce on gilt wire, and 6 d. the ounce on ſilver wire.

If any brewers do not make true entries of their liquors brewed, once a week at the exciſe office, they forfeit 10 l. but this is ſubject to mitigation, ſo as not to be leſs than double the duty; and the retailers of beer and ale and ſtrong waters, neglecting to make their entries once a month of what liquors they retail, are liable to 40 s. penalty. In caſe any brewer erects or alters any back, copper, cooler, *&c.* or keeps a private ſtore-houſe, or if any malſter keeps any private veſſel for ſteeping barley, without giving proper notice to the officers of exciſe, ſuch brewer or malſter forfeit 50 l. and where they bribe a gauger, it is 10 l. The officers of exciſe may go on board ſhips, and ſearch for any exciſeable liquors, as officers of the cuſtoms do, and ſeize commodities forfeited, *&c.* and complaints made at the chief office of exciſe, are to be heard by three or more commiſſioners; but two juſtices of the peace have the power to determine, in ſeizures out of the limits of the exciſe office in London.

EXCLAMATION, in rhetoric, a figure that expreſſes the violent and ſudden breaking out, and vehemence of any paſſion. Such is that in the ſecond book of Milton's Paradiſe Loſt.

O unexpected ſtroke, worſe than of death!
Muſt I thus leave thee, Paradiſe? Thus leave
Thee, native ſoil; theſe happy walks and ſhades,
Fit haunt of gods!

Other figures are the language of ſome particular paſſion, but this expreſſes them all. It is the voice of nature, when ſhe is in concern and tranſport.

EXCLUSION, or *Bill of* EXCLUSION, a bill propoſed about the cloſe of the reign of king Charles II. for excluding the duke of York, the king's brother, from the throne, on account of his being a papiſt.

EXCLUSION, in mathematics, is a method of coming at the ſolution of numerical problems, by previouſly throwing out of our conſideration ſuch numbers as are of no uſe in ſolving the queſtion. Mr. Frenicle gives an account of it in the Ouvrages de Mathematique, *&c.*

EXCLUSIVE is ſometimes uſed adjectively, thus. *A patent carries with it an excluſive privilege*; and ſometimes adverbially, as, *he ſent him all the numbers from* n° 145 *to* n° 247 *excluſive*; that is, all between theſe two numbers, which themſelves were excepted.

EXCLUSIVE PROPOSITIONS, in logic, are thoſe where the predicate ſo agrees with its ſubject, as to exclude every other. Thus, *virtue alone conſtitutes nobility*, is an excluſive propoſition.

EXCOMMUNICATION, an eccleſiaſtical penalty or cenſure whereby ſuch perſons as are guilty of any notorious crime or offence, are ſeparated from the communion of the church, and deprived of all ſpiritual advantages.

Excommunication among the Jews, according to Elias, a German rabbin, was diſtinguiſhed into three kinds, 1. Niddui, which was a ſeparation of but a few days, 2. Cherem, a ſeparation attended with execration and malediction. And, 3.

Shammatha, which was the laſt and greater excommunication. But Selden ſays, that niddui and ſhammatha are the ſame thing, and therefore that there were but two kinds of excommunication among the Jews, *viz.* the greater and the leſſer. They made alſo another diſtinction in excommunication, into total or univerſal, by which a man was excommunicated with regard to all men; and partial, by which a man was excommunicated in one city, and with regard to certain perſons, and not others.

It is obſervable, that not only the judges had the power of excommunicating, but that each particular perſon in converſation might excommunicate another, and himſelf likewiſe; and this excommunication, if well grounded, was of force: nay, if a man dreamed that he was excommunicated by himſelf or by another, he was conſidered as an excommunicated perſon, becauſe this dream was ſuppoſed to be ſent from God.

As to the effects of the jewiſh excommunication, the leſſer excluded the excommunicated perſon from the ſociety of men; that is, he was not to come nearer them than four cubits, neither he, his wife, children, or domeſtics, according to Buxtorf. The greater abſolutely ſequeſtered the perſon from the converſation of others; and ſometimes he was ſhut up in a ſmall chamber or priſon, where he lived alone. Baronius and Beza pretend, that the greater excommunication excluded men from the uſe of ſacred things. Selden, on the contrary, affirms, that they were allowed to be preſent in the temple, and partake of the public worſhip. Buxtorf, who is of the ſame opinion, adds, that whereas others came into the temple at the right hand, and went out at the left, the excommunicated were obliged both to go in and out at the left.

Excommunication among the modern Jews, is attended with the moſt terrible conſequences. The excommunicated perſon is refuſed all human aſſiſtance: if there be a corpſe in his houſe, or a child to be circumciſed, none muſt help him. He is curſed by the book of the law, by the curſe of Joſhua againſt Jericho, by that of Eliſha againſt the children, by heaven and earth, and God is beſought that a whirlwind may daſh him to pieces. He is pelted with ſtones if he appear in the ſtreets; and if he obtains abſolution, it is upon the moſt mortifying conditions; for he is publicly tied to a poſt and whipped, after which he lays himſelf down at the door of the ſynagogue, and all thoſe who go out, paſs over him. This was the very caſe of the famous jew Acoſta. See BAYLE in the article Acoſta.

In the antient chriſtian church, the power of excommunication, as well as other acts of eccleſiaſtical diſcipline, was lodged in the hands of the clergy, who diſtinguiſhed it into the greater and leſſer. The leſſer excommunication ſimply called αφορισμος, ſeparation or ſuſpenſion, conſiſted in excluding men from the participation of the euchariſt, and the prayers of the faithful. But they were not expelled the church; for they had the privilege of being preſent at the reading of the ſcriptures, the ſermons, and the prayers of the catechumens and penitents. This excommunication was inflicted for leſſer crimes, ſuch as neglecting to attend the ſervice of the church, miſbehaviour in it, and the like.

The greater excommunication, called παντελης αφορισμος, total ſeparation and anathema, conſiſted in an abſolute and intire excluſion from the church and the participation of all its rites. When any perſon was thus excommunicated, notice were given of it by circular letters to the moſt eminent churches all over the world, that they might all confirm this act of diſcipline, by refuſing to admit the delinquent to their communion. The conſequences of this latter excommunication were very terrible. The excommunicated perſon was avoided in civil commerce and outward converſation. No one was to receive him into his houſe, nor eat at the ſame table with him; and when dead, he was denied the ſolemn rites of burial. It has been a queſtion, whether the antient church uſed to add execration to her cenſures. Grotius thinks this was done, though very ſeldom, as in the caſe of Julian the apoſtate, for whoſe deſtruction the antient chriſtians abſolutely prayed to God. St. Chryſoſtom was utterly againſt this practice, affirming that we ought not to pray againſt the ſinner, but againſt his opinions or actions.

The romiſh pontifical takes notice of three kinds of excommunication. 1. The minor, incurred by thoſe who have any correſpondence with an excommunicated perſon. 2. The major, which falls upon thoſe who diſobey the commands of the holy ſee, or refuſe to ſubmit to certain points of diſcipline; in conſequence of which they are excluded from the church militant and triumphant, and delivered over to the devil and his angels. 3. Anathema, which is properly that pronounced by the pope againſt heretical princes and countries. In former ages, theſe papal fulminations were moſt terrible things; but at preſent, they are formidable to none but a few petty ſtates of Italy. See ANATHEMA and FULMINATION.

Excommunication in the greek church, cuts the offender off from all communion with the 318 fathers of the firſt council of Nice, and with the ſaints; conſigns him over to the devil and the traitor Judas; and condemns his body to remain after death as hard as a flint or piece of ſteel, unleſs he humbles himſelf and makes attonement for his ſins by a ſincere repentance. The form abounds with dreadful imprecations; and the Greeks aſſert, that if a perſon dies excommunicated, the devil enters into the lifeleſs corpſe; and therefore in order to prevent it, the relations of the deceaſed cut his body in pieces, and boil them in wine. It is a cuſtom for the patriarch of Jeruſalem annually to excommunicate the pope and the church of Rome; on which occaſion, together with a great deal of idle ceremony, he drives a nail into the ground with a hammer, as a mark of malediction.

The form of excommunication in the church of England, antiently ran thus: "By the authority of God the father almighty, the Son and Holy Ghoſt, and of Mary the bleſſed mother of God, we excommunicate, anathematize, and ſequeſter from the pale of holy mother-church," &c. The cauſes of excommunication with us, are contempt of the biſhop's court, hereſy, neglect of public worſhip and the ſacraments, incontinency, adultery, ſimony, &c. It is publiſhed in the church, and if the offender does not ſubmit in forty days, the civil magiſtrate interpoſes, and the excommunicated perſon is impriſoned till he ſubmits and obtains abſolution. Excommunication diſables a perſon from doing any judicial act, as ſuing in an action at law, being a witneſs, &c. See EXCOMMUNICATO CAPIENDO, &c.

Excommunication, among the pagans, excluded the perſon from the ſacrifices and the temples, and delivered him over to the furies, which was called *exſecrare* and *diris devovere*. When Marcus Craſſus ſet out on his expedition againſt the Parthians, Atteius, tribune of the people, not being able to prevent him, ran to the gate of the city through which the general was to paſs, and ſetting a chaffing-diſh in the middle of the way with fire in it, when Craſſus drew near, he threw ſome perfumes into the chaffing-diſh, and pronounced curſes againſt Craſſus with great exclamation, and thus excommunicated him.

EXCOMMUNICATO CAPIENDO, a writ iſſued from the chancery upon the biſhop's certifying an excommunication. This writ is directed to the ſheriff to take the body of the perſon excommunicated, and impriſon him until he has made ſatisfaction to the church for the contempt or wrong done. See EXCOMMUNICATION.

In the certificate of an excommunication, the cauſe is to be particularly expreſſed, that the judges may ſee whether the eccleſiaſtical court has cognizance of the cauſe; and if the ordinary excommunicate a perſon for a thing of which he hath no cognizance, the party may bring an action againſt him, and in ſome caſes may be delivered by habeas corpus, or by prohibition.

EXCOMMUNICATO DELIBERANDO, a writ directed to a ſheriff for the delivery of an excommunicated perſon, upon the biſhop's certifying to the king, that he hath conformed to the eccleſiaſtical juriſdiction.

EXCOMMUNICATO RECIPIENDO, a writ where excommunicated perſons being committed to priſon, and afterwards illegally delivered, are commanded to be retaken and impriſoned again.

EXCORIATION, in medicine and ſurgery, the galling or rubbing off of the cuticle, eſpecially of the parts between the thighs, and about the anus.

In adults, it is occaſioned by riding, much walking, or other vehement exerciſe, and may be cured by vulnerary applications. In children, there is often an excoriation not only of the parts near the pudenda, chiefly of the groin and ſcrotum, but likewiſe in the wrinkles of the neck, under the arms, and in other places; proceeding from the acrimony of the urine and ſweat, and occaſioning itching pains, crying, watching, and reſtleſſneſs.

To remedy this, the parts affected may be waſhed often with warm water, and ſprinkled with drying powders, as chalk, hartſhorn, but eſpecially tutty, lapis calaminaris, and ceruſs, which may be tied looſely in a rag, and the powder ſhook out on the diſordered places. If the parts tend to a real ulceration, it will be proper to add a little ſugar of lead to the powder, or to anoint the place with unguent. alb. camphor. Likewiſe a little white vitriol, diſſolved in ſpring-water, and daubed upon the part, will dry and heal it very powerfully.

EXCORTICATION, the ſame with barking of trees. See the article BARKING.

EXCREMENT, whatever is diſcharged out of the body of animals after digeſtion, or the fibrous parts of the aliment, mixed with the bile, ſaliva, and other fluids. Urine and the fæces are the groſs excrements that are diſcharged out of the bladder or belly. Other excrements are the various humours that are ſecreted from the blood through the various ſtrainers in the body, and which ſerve for ſeveral uſes, ſuch as the ſaliva, ſweat, bile, the pancreatic juice, lymph, the ſemen, nails, the hair, the horns and hoofs of animals. The ejection of excrements is an evacution by urine, ſtool, ſpittle, *&c.* Unleſs the excretions are regular, health cannot be maintained, and therefore, if they are too plentiful, defective, or ſuppreſſed, they will occaſion various diſorders: hence, if a perſon be coſtive, it is generally the forerunner of ſome diſeaſe. As a man generally takes more aliment than is neceſſary to generate blood and ſerum, and the common excretions are not ſufficient to carry off ſuperfluous humours, extraordinary ones ſometimes happen, at ſtated times; as the piles, hæmorrhages, *&c.* See more upon this under the articles DISEASE and EXCRETION.

EXCRESCENCE, in ſurgery, denotes every preternatural tumour which ariſes upon the ſkin, either in the form of a wart or tubercle. If they are born with a perſon, as they frequently are, they are called *nævi materni*, or marks from the mother; but if the tumour is large, ſo as to depend from the ſkin like a fleſhy maſs, it is then called a ſarcoma.

Excreſcences ariſe in all parts of the body, but more eſpecially the head, face, eye-brows, neck, breaſt, abdomen, anus, legs, and arms. Their ſize and figure are various; with regard to their colour, ſome reſemble that of the ſkin, others are inclined to black or red; and, with reſpect to their figure, they reſemble ſtrawberries, mulberries, grapes, figs, pears, mice, and the like.

As to the general treatment of them, they may be removed either by ligature, the knife, or actual and potential cauteries, according as the patient's habit of body and other circumſtances may require. However, it is to be obſerved, that if theſe excreſcences have a very large root, if there are large arteries or veins near the root, or if it be firmly joined to the bone, in theſe caſes, the ſurgeon ſhould remove them with great caution; or, in caſes of great danger, wholly neglect them. When theſe tumours lie near large blood-veſſels, it is proper to have ſtyptics, bandages, and often actual cauteries in readineſs to ſtop the hæmorrhage, eſpecially if they are removed by abſciſſion.

EXCRETION, or SECRETION, in medicine, a ſeparation of ſome fluid, mixed with the blood, by means of the glands. Excretions, by which we mean thoſe that evacuate ſuperfluous and heterogeneous humours, purify the maſs of blood: the humours which are generated in the blood are excreted by the glands, and are replaced by a ſufficient quantity of aliment. This, in adults, keeps the body of an equal weight, and conſequently preſerves life and health: therefore the ſecretions ought neither to be diſturbed or diminiſhed, ſuppreſſed or increaſed: the extraordinary excretions, ſuch as the bleeding piles, and hæmorrhages of the noſe, alſo large ſweats, looſeneſs, running at the noſe, coughs, catarrhs, plentiful ſpitting, all promote health; and if theſe are defective or ſuppreſſed, dangerous diſeaſes may ariſe: wherefore it is highly hazardous to ſuppreſs ſecretions of this kind. See the article EXCREMENT.

EXCRETORY, in anatomy, a term aplied to certain little ducts or veſſels, deſtined for the reception of a fluid, ſecreted in certain glandules, and other viſcera, for the excretion of it in the appropriated places. See the preceding article.

All the glands are uſually furniſhed with an excretory duct. See GLAND.

EXCURSION, in aſtronomy, is uſed in a ſynonymous ſenſe with elongation. See the article ELONGATION.

Circles of EXCURSION. See the preceding article.

EXCUTIA *Ventriculi*, the ſtomach bruſh, a name given, by modern ſurgeons, to an inſtrument made of ſoft briſtles, formed into a bundle, and fixed upon a flexible braſs wire, for cleanſing the throat, or even the ſtomach. The ſtomach bruſh is compoſed of ſoft hair faſtened together into a bundle by a twiſted braſs or ſteel wire, and the handle or ſtem of it is inveſted with ſilk. This has been greatly recommended, by ſome, to remove foreign bodies out of the fauces and œſophagus; and, to ſcower the ſtomach. The method of uſing it is this: The patient is firſt to drink a ſmall draught of warm water, then the bruſh is to be received into the œſophagus, and gently protruded down into the ſtomach, by twiſting round and round its handle, and, when in the ſtomach, it is to be drawn up and down many times, like the ſucker in a ſyringe, and at length wholly extracted. The advantages ſaid to ariſe from this, are very great, ſuch as the prolonging life to a great age, and the like; but few people have been willing to try the effects of ſo diſagreeable and troubleſome an operation. Wedelius and Teichmeir have written expreſs treatiſes on this inſtrument, and one of them has attempted to prove it no new contrivance, but a thing very early known, deſcribed, and uſed in phyſic.

EXECRATION, *execratio*, in antiquity, a kind of puniſhment, conſiſting of direful curſes and marks of infamy: ſuch was that uſed againſt Philip king of Macedon, by the Athenians. A general aſſembly of the people being called, they made a decree, that all the ſtatues and images of that king, and of all his anceſtors, ſhould be demoliſhed, and their very names razed; that all the feſtivals, ſacred rites, prieſts, and whatever elſe had been inſtituted in honour of him, ſhould be prophaned; that the very places where there had been any monument or inſcription to his honour, ſhould be deteſtable; that nothing ſhould be ſet up or dedicated in them, which could be done in clean places: and, laſtly, that the prieſts, as often as they prayed for the athenian people, allies, armies, and fleets, ſhould as many times deteſt and execrate Philip, his children, kingdom, land and ſea forces, and the whole race and name of the Macedonians.

At the taking and demoliſhing a city, it was frequent to pronounce dreadful curſes and execrations upon whoever ſhould endeavour to rebuild it; which ſome imagine was the reaſon that Troy could never be raiſed out of its aſhes, though ſeveral perſons attempted it, being devoted to eternal and irreparable ruin by Agamemnon. We find Joſhua at the deſtruction of Jericho, fix an imprecation upon the perſon who ſhould endeavour to rebuild it, which was accompliſhed in Hiel the Bethelite, many ages after.

EXECUTION, in a general ſenſe, the act of accompliſhing, finiſhing, or atchieving any thing to be done.

EXECUTION, in law, the compleating or finiſhing ſome act, as of judgment, deed, &c. and it uſually ſignifies the obtaining poſſeſſion of any thing received by judgment of law. See JUDGMENT.

Sir Edward Coke obſerves, that there are two ſorts of executions: the one final, and the other a quouſque, that tends to an end. An execution final, is that which makes money of the defendant's goods, or extends to his lands, and delivers them to the plaintiff, who accepts the ſame in ſatisfaction; and this is the end of the ſuit, and the whole that the king's writ requires to be done. The writ or execution with a quouſque, though it tends to an end, yet is not final, as in the caſe of a capias ad ſatisfac. where the defendant's body is to be taken, in order that the plaintiff may be ſatisfied for his debt. See the article CAPIAS.

Executions are either in perſonal, real, or mixed actions. In a perſonal action, the execution may be made three ways, *viz.* by the writ of capias ad ſatisfaciendam, againſt the body of the defendant; fieri facias, againſt his goods; or elegit, againſt his lands. See the article FIERI FACIAS and ELEGIT.

In a real and mixed action, the execution is by writ of habere facias ſeiſinam, and habere poſſeſſionem. See HABERE.

Writs of execution bind the property of goods only from the time of delivery of the writ to the ſheriff; but the land is bound from the day of the judgment obtained: and here the ſale of any goods for valuable conſideration, after a judgment, and before the execution awarded, will be good. It is otherwiſe as to lands, of which execution may be made, even on a purchaſe after the judgment, though the defendant ſell ſuch land before execution. Likewiſe, ſheriffs may deliver in execution all the lands whereof others ſhall be ſeiſed in truſt for him, againſt whom execution is had on a judgment, &c.

When any judgment is ſigned, the execution may be taken out immediately thereon; but if it be not iſſued within a year and a day after, where there is no fault in the defendant, as in the caſe of an injunction, writ of error, &c there muſt a ſcire facias to revive the judgment;

though, if the plaintiff ſues out any writ of execution within the year, he may continue it after the year is expired. After judgment againſt the defendant, in an action wherein ſpecial bail is given, the plaintiff is at liberty to have execution againſt ſuch defendant, or againſt his bail: but this is underſtood where the defendant does not render himſelf, according to law, in ſafeguard of the bail; and execution may not regularly be ſued forth againſt a bail, 'till a default is returned againſt the principal: alſo, if the plaintiff takes the bail, he ſhall never take the principal. It is held that an execution may be executed after the death of the defendant; for his executor, being privy thereto, is liable, as well as the teſtator. The execution is an entire thing, ſo that he who begins muſt end it: therefore, a new ſheriff may diſtrain an old one, to ſell the goods ſeiſed on a diſtringas, and to bring the money into court.

Execution *of judgment*, in criminal caſes. This muſt be purſuant to the judgment, and the king may not alter it, for this reaſon, that no execution can be warranted by law, but where it is according to the judgment given; yet the king may pardon part of the execution in judgment for treaſon, *viz.* all but beheading.

The execution of criminals is to be made by the proper officer; and if the ſheriff, or other officer impowered to do it, alters the execution, or any other executes an offender, or if he be killed without authority of law, it is felony. Where a perſon condemned to die comes to life after he is hanged; in this caſe, as the judgment is not executed till he is dead, he ought to be hung up again. And the bodies of felons are forfeited to the king by the execution, who may diſpoſe of them as he pleaſes.

Military **Execution**, the pillaging or plundering of a country, by the enemy's army.

EXECUTIONE facienda, a writ that iſſues for the execution of a judgment, and is uſed in divers caſes. See the articles Execution and Judgment.

Executione facienda in withernamium, a writ which lies for taking a perſon's cattle, who has conveyed the cattle of another out of the country, ſo that the ſheriff is not able to replevy them.

Executione judicii, a writ directed to the judge of an inferior court, commanding him to execute a judgment therein, or to return reaſonable cauſe why he delays the execution.

If on this writ execution be not done, or ſome reaſonable cauſe ſhewn why it is delayed, an alias ſhall iſſue, and afterwards a pluries, &c. And if on this laſt writ execution is not done, or ſome reaſonable cauſe returned for its being ſo delayed, the party ſhall have an attachment againſt him who delays the ſame, and the attachment is made returnable in the king's bench or common pleas.

EXECUTOR, in law, a perſon appointed by another's laſt will and teſtament, to have the execution of the ſame after his deceaſe, and the diſpoſing of the teſtator's goods and effects, according to the intent of the will.

The law accounts an executor one perſon with the party whoſe executor he is; having all the advantages of action, and being ſubject to the ſame actions as the deceaſed.

Hence as an executor derives his power wholly from the will, he may releaſe a debt, or do any thing as executor, before probate of the will, provided he afterwards proves it: however, to maintain actions for debts, he muſt ſhew the teſtament proved. He may immediately take the goods, or give power to another to ſeize them for him.

A perſon capable of making an executor, either makes one, two, three, or more; and he may appoint, that one ſhall be his executor for one year, and another for another. If he appoints executors only for a certain number of years, after they are elapſed, the ordinary may grant adminiſtration of the goods; as he may do, till the power of executors take place. It is alſo obſervable, that where there is no executor, there is properly no will; and where there is no will, there can be no executors: but this only regards goods; for where lands in fee are deviſed, it is a good will, though no executors be named therein.

An executor may either accept or refuſe the executorſhip; but after he has accepted the office, he ſhall not refuſe the ſame, nor take it up after refuſal. If any one of ſeveral executors prove the will, it will ſerve for all; ſo that the reſt may at any time after join with him, and intermeddle with the eſtate. When any action is brought, it muſt be in the names of all the executors, notwithſtanding ſome of them may not act; but in any action commenced againſt them, he only that adminiſters is to be ſued. The poſſeſſion of one executor, is held to be poſſeſſion of them all; and moſt acts done by or to one, are deemed done by or to all of them.

The particular duty of an executor, is to bury the teſtator in a decent manner, according to his rank and circumſtances, and with a due regard to the eſtate left; for whatever the executor lays out in funeral charges extravagantly, if there be not enough to pay debts, he muſt bear it at his own expence. He is to make an inventory of all the goods and chattels of the deceaſed, with their value; and then, or before, if requiſite, where there is enough to pay the teſtator's debts and legacies, he ought to prove the will before the ordinary in common form, either by his own oath, or by witneſſes, if required by thoſe who have a right to queſtion it: and when exhibited in the regiſter's office of the eccleſiaſtical court, a copy thereof in parchment is delivered to the executor under the ordinary's ſeal, which is called the probate.

The executor is next to pay all debts, before legacies, in the order following, *viz.* the charges of the funeral being firſt paid, the king's debt is to be preferred before all others; then debts on judgments, and ſtatutes and recognizances, thoſe due upon mortgages, bonds, and other ſpecialities; after them, rent on leaſes, ſervants wages, debts on notes, and ſhop-books: for if he pays the debts in any other order, he is liable to the payment of debts of a higher degree, though out of his own eſtate; yet, among debts of equal degree, an executor may pay himſelf firſt: and ſuch as are firſt ſued for, ſhall be firſt paid; and if no ſuit be commenced, he may pay the whole debt to any one creditor, although there ſhould be nothing left to pay another any part of his. In caſe the teſtator is bound in ſeveral bonds, his executors has the privilege to pay which bond he pleaſes, unleſs an action of debt is actually proſecuted againſt him upon ſome of the other bonds; and in ſuch a caſe, if while an action of this kind is depending, another bond-creditor brings another action, before any judgment is obtained, he may prefer which he will by confeſſing a judgment to one, and paying him; which judgment may be pleaded in bar to the other action.

After the debts, an executor is to pay the legacies; and he may prefer a legacy to himſelf, though there ſhould not be enough to pay any of the reſt. He may likewiſe pay what legacies he pleaſes firſt, or give to each legatee a part, in proportion, if there is not enough to pay the whole. However, if there be a ſpecific legacy of ſome particular thing, as a horſe, or ſilver-cup, it muſt be delivered before any other legacy.

In caſe an executor pays out the aſſets in legacies, and afterwards debts appear, of which he had no notice, which he is obliged to pay; he may, by a bill in chancery, compel the legatees to refund.

After the debts and legacies are paid, whatever remains, it is ſaid, belongs to the executor by the common law; but this has been conſtrued, where the executor is a relation of the deceaſed, and had no legacy or other proviſion by the will. Hence, where a perſon made a will, and an executor, without diſpoſing of the reſidue of his perſonal eſtate, it has been adjudged, that the remainder ſhould not go to the executor, but be diſtributed among the relations of the teſtator by adminiſtration.

EXECUTOR DE SON TORT, or an executor of his own wrong, a perſon that takes upon him the office of an executor by intruſion, without being ſo conſtituted by the teſtator, or appointed by the ordinary to adminiſter. Such a perſon is chargeable to the rightful executor, as alſo to all the teſtator's creditors and legatees, ſo far as the goods amount to which he wrongfully poſſeſſed.

EXECUTORY, in law, is where an eſtate in fee, that is made by deed or fine, is to be executed afterwards by entry, livery or writ. Leaſes for years, annuities, conditions, &c. are termed inheritances executory.

EXECUTORY DEVISE, is when the fee by deviſe is veſted in any perſon, that is to be veſted in another upon contingency. In all caſes of executory deviſes, the eſtates deſcend until the contingencies happen. The remainder of a fee may not be limited by the rules of law after a fee ſimple, unleſs ſuch eſtate depends upon a contingency or is conditional, when it may take place as an executory deviſe. Executory deviſes of terms for years, ought to ariſe within the compaſs of one life.

EXEDRÆ, in antiquity, a general name for ſuch buildings as were diſtinct from the main body of the churches, and yet within the limits of the church taken in its largeſt ſenſe. Among the expdræ the chief was the baptiſtery. See the article BAPTISTERY.

Expedræ were alſo halls or little academies with ſeveral ſeats, upon which philoſophers rhetoricians, &c. ſat, when they met for converſation or diſputation. Vitruvius ſpeaks of them as places very open and expoſed to the ſun.

EXEGESIS, a diſcourſe by way of explanation or comment upon any ſubject. In the Scotch univerſities, there is an exerciſe among the ſtudents in divinity called an exegeſis, in which a queſtion is ſtated by the reſpondent, who is then oppoſed by two or three other ſtudents in their turns; during which time the profeſſor moderates, and ſolves the difficulties which the reſpondent cannot overcome.

EXEGETICA, a term uſed by ſome for the method of extracting the roots of equations. See the articles EXTRACTION, and EQUATION.

EXEMPLAR, denotes much the ſame with model. See the article MODEL.

EXEMPLIFICATION *of letters patent*, a tranſcript or duplicate of them, made from the inrollment thereof, and ſealed with the great ſeal.

Theſe exemplifications are by ſtatute equally effectual, and may be pleaded as well as the originals. One may exemplify a patent under the great ſeal in chancery; alſo any record, or judgment, in any of the courts at Weſtminſter, under the ſeal of each court; which exemplifications may be given in evidence to a jury. It is held that nothing but matter of record ought to be exemplified.

EXEMPLIFICATIONE, in law, a writ granted for the exemplification of any original record. See the articles EXEMPLIFICATION and RECORD.

EXEMPTION, in law, a privilege to be free from ſome ſervice or appearance: thus, barons and peers of the realm are, on account of their dignity, exempted from being ſworn upon inqueſts; and knights, clergymen, and others, from appearing at the ſheriff's turn. Perſons of ſeventy years of age, apothecaries, &c. are alſo by law exempted from ſerving on juries; and juſtices of the peace, attornies, &c. from pariſh-offices.

EXEMPTION, in the church of Rome, a privilege granted by the pope to the clergy, and ſometimes to the laity, to exempt or free them from the juriſdiction of their reſpective ordinaries. Thus monaſteries, and even private prieſts, for a ſmall charge, formerly procured exemptions from the juriſdiction of their biſhops. In this, however, the council of Trent made a ſmall reformation, by aboliſhing the exemption of particular prieſts, and monks not living in cloyſters, and that of chapters in criminal matters.

EXERCISE, among phyſicians, ſuch an agitation of the body as produces ſalutary effects in the animal œconomy.

Exerciſe may be ſaid to be either active or paſſive. The active is walking, hunting, dancing, playing at bowls, and the like; as alſo ſpeaking, and other labour of the body and mind. The paſſive is riding in a coach, on horſeback, or in any other manner. Exerciſe may be continued to a beginning of wearineſs, and ought to be uſed before dinner, in a pure light air; for which reaſon, journeys and going into the country contribute greatly to preſerve and re-eſtabliſh health.

Exerciſe increaſes the circulation of the blood, attenuates and divides the fluids, and promotes a regular perſpiration, as well as a due ſecretion of all the humours; for it accelerates the animal ſpirits, and facilitates their diſtribution into all the fibres of the body, ſtrengthens the parts, creates an appetite; and helps digeſtion. Whence it ariſes, that thoſe who accuſtom themſelves to exerciſe are generally very robuſt, and ſeldom ſubject to diſeaſes.

Boerhaave recommends all bodily exerciſes in diſeaſes of a weak and lax fibre. By riding on horſeback, ſays his commentator, the pendulous viſcera of the abdomen are ſhaken every moment, and gently rubbed as it were one againſt another, while in the mean time the pure air acts on the lungs with a greater force. But it is to be obſerved, that a weak man ſhould not ride on a full ſtomach, but either before dinner, or after the digeſtion is near finiſhed; for when the ſtomach is diſtended, weak people do not bear theſe concuſſions of the horſe, without difficulty; but when the primæ viæ are near empty, the remaining fæces are diſcharged by this concuſſion. Sailing in a ſhip is alſo an exerciſe of great uſe to weak people, If the veſſel moves with an even motion, by increaſing perſpiration it uſually excites a wonderful alacrity, creates an appetite, and promotes digeſtion. Theſe exerciſes are more eſpecially ſerviceable to weak people; but in order to corroborate the body by muſcular motion, walking, running, and bodily exerciſes are to be uſed. In theſe we ſhould begin with the moſt gentle, ſuch as walking, and increaſe it by degrees till we come to running. Thoſe exerciſes of the body are more eſpecially ſerviceable which give delight to the mind at the ſame time, as tennis, fencing, *&c.* for which reaſon the wiſdom of antiquity appointed rewards for thoſe who excelled in theſe gymnaſtic exerciſes, that by this means the bodies of their youth might be hardened for warlike toils. See the article GYMNASTICS.

As nothing is more conducive to health than moderate exerciſe, ſo violent exerciſe diſſipates the ſpirits, weakens the body, deſtroys the elaſticity of the fibres, and exhauſts the fluid parts of the blood. No wonder then, that acute and mortal fevers often ariſe from too violent exerciſe of the body; for the motion of the venal blood towards the heart being quickened by the contraction of the muſcles, and the veins being thus depleted, the arteries more eaſily propel their contained humours through the ſmalleſt extremities into the now leſs reſiſting veins, and therefore the velocity of the circulation will be increaſed thro' all the veſſels. But this cannot be performed without applying the humors oftener, or in a greater quantity to the ſecretory organs in the ſame time, whence the more fluid parts of the blood will be diſſipated, what remains will be inſpiſſated, and by the greater action of the veſſels upon their contained fluids, and of the reacting fluids upon the veſſels, the blood acquires an inflammatory denſity. Add to this, that by the violent attrition of the ſolids and fluids, together with the heat thence ariſing, all the humours will incline to a greater acrimony, and the ſalts and oils of the blood will become more acrid and volatile. Hence, ſays Boerhaave, thoſe fevers which ariſe from too much exerciſe or motion, are cured by reſt of body and mind, with ſuch aliments and medicines as moiſten, dilate, and ſoften, or allay acrimony.

The exerciſe of a ſoldier in camp, conſidered as conducive to health, Dr. Pringle diſtinguiſhes into three heads, the firſt relating to his duty, the ſecond to his living more commodiouſly, and the third to his diverſions. The firſt conſiſting chiefly in the exerciſe of his arms, will be no leſs the means of preſerving health, than of making him expert in his duty, and frequent returns of this early, and before the ſun grows hot, will be made more advantageous than repeating it ſeldom, and ſtaying out long at a time; for a camp affording little convenience for refreſhment, all unneceſſary fatigue is to be avoided. As to the ſecond article, cutting boughs for ſhading the tents, making trenches round them for carrying off the water, airing the ſtraw, cleaning their cloths and accoutrements, and aſſiſting in the buſineſs of the meſs, ought to be no diſagreeable exerciſe to the men for ſome part of the day. Laſtly, as to diverſions, the men muſt be encouraged to them either by the expmple of their officers, or by ſmall premiums to thoſe who ſhall excel in any kind of ſports, as ſhall be judged moſt conducive to health; but herein great caution is neceſſary not to allow them to fatigue themſelves too much, eſpecially in hot weather, or ſickly times; but above all, that their cloaths be kept dry, wet cloaths being the moſt frequent cauſes of camp diſeaſes.

EXERCISE, in military affairs, is the ranging a body of ſoldiers in form of battle, and making them perform the ſeveral motions and military évolutions with different management of their arms, in order to make them expert therein.

EXERCISES are alſo underſtood of what young gentlemen learn in the academies and riding ſchools, ſuch as fencing, dancing, riding the great horſe, *&c.*

EXERGUM, among antiquarians, a little ſpace around or without the figures of a medal, left for the inſcription, cypher, device, date, *&c.*

EXETER, the capital city of Devonſhire, ſituated on the river Ex, ten miles north of the britiſh channel: weſt long. 3° 40′, north lat. 50° 44′.

It is a biſhop's ſee, ſends two members to parliament, and gives the title of earl to a branch of the noble family of Cecil.

EXFOLIATION, a term uſed by ſurgeons for the ſcaling of a bone, or its riſing and ſeparating into thin laminæ or ſcales.

EXFOLIATIVE TREPAN, one for raiſing the flakes or ſcales of a bone, one after another. See the article TREPAN.

EX GRAVI QUERELA, in law, is a writ, that lies for the perſon to whom any lands or tenements in fee are deviſed by will, and the heir of the deviſor enters thereon, and detains them from the deviſee. Alſo, where a perſon deviſes ſuch lands to another in tail with the remainder over in fee: here if the tenant in tail enter, and is ſeiſed by force of the intail, and afterwards he dies without iſſue; the perſon in remainder, or reverſion, may bring this writ to execute the deviſe. See the article DEVISE.

EXHALATION, a general term for all effluvia or ſteams raiſed from the ſurface of the earth, in form of vapour. See the articles VAPOUR and EFFLUVIUM.

Some, indeed, diſtinguiſh exhalations from vapours; expreſſing by the former, all ſtreams emitted from ſolid bodies, as earth, fire, ſulphur, ſalts, minerals, *&c.* and by the latter, the ſteams raiſed from water, and other fluids. Exhalations, therefore, according to them, are dry, ſubtile corpuſcles, or effluvia, which are looſened and freed from hard earthy bodies, either by the heat of the ſun, the agitation of the air, or the like cauſes; and being blended in the atmoſphere with the moiſt vapours, help to conſtitute or form clouds and meteors, See the article CLOUD, *&c.*

Nitrous and ſulphureous exhalations are the chief matters of which thunder, lightning, and other meteors are generated in the air. True air is alſo generated by, or rather ſet at liberty along with, theſe exhalations, which it ſerves to buoy up in the atmoſphere. See the articles AIR and ATMOSPHERE.

Mr. Boyle informs us, that the exhalations from mines are hot; as are thoſe aſcending from ſome wells. See the article DAMPS, *&c.*

EXHAUSTED RECEIVER, a glaſs, or other veſſel, out of which the air hath been drawn by means of the air-pump. See the article AIR-PUMP.

EXHAUSTION, in mathematics, a method in frequent uſe among the antient mathematicians, as Euclid, Archimedes, *&c.* that proves the equality of two magnitudes, by a deduction ad abſurdum, in ſuppoſing that, if one be greater or leſs than the other, there would follow an abſurdity.

This is founded upon what Euclid ſaith in his tenth book, *viz.* "That thoſe "quantities, whoſe difference is leſs "than any aſſignable one, are equal." For if they were unequal, be the difference never ſo ſmall, yet, it may be ſo multiplied, as to become greater than either of them: if not ſo, then it is really nothing. This he aſſumes in the proof of the 1ſt propoſition of book 10, which is, "That if from the greater of "two quantities, you take more than "its half, and from the remainder "more than its half, and ſo continually, "there will, at length, remain a quantity leſs than either of thoſe propoſed."

On this foundation they demonſtrate, that if a regular polygon of infinite ſides be inſcribed in, or circumſcribed about, a circle; the ſpace that is the difference between the circle and the polygon will, by degrees, be quite exhauſted, and the circle be equal to the polygon.

EXHEREDATION, *exhæridatio*, in the civil law, the excluſion of a ſon by the father from inheriting his eſtate; termed, among us, diſinheriting.

EXHIBIT, in law, is where a deed, or other writing, being produced in a chancery ſuit, to be proved by witneſſes, the examiner, or commiſſioner appointed after the examination of any ſuch, certifies on the back of the deed, or writing, that the ſame was ſhewn to the witneſs, at the time of his examination, and by him ſworn to.

EXHIBITION, a benefaction ſettled for the benefit of ſcholars in the univerſities, that are not on the foundation.

EXHIBITION was antiently an allowance for meat and drink, ſuch as the religious appropriators made to the poor depending vicar.

EXHORTATION, in rhetoric, differs only from ſuaſion, as being more directly addreſſed to the paſſions.

EXHUMATION, the digging up of a body interred in holy ground, by the authority of a judge. By the French law the exhumation of a dead body is ordered, upon proof that he was killed in a duel; and a parſon may demand the exhumation of any of his pariſhioners, when interred out of the pariſh, without his conſent.

EXIGENT, in law, a writ which lies where the defendant in a perſonal action cannot be found, nor any effects of his within the county, by which he may be attached or diſtrained.

This writ is directed to the ſheriff, to proclaim and call the defendant five county-court days, one after another, charging him to appear under the pain of outlawry. Where a perſon indicted of felony, *&c.* abſents himſelf ſo long, that the writ of exigent is awarded againſt him, ſuch a withdrawing will be deemed a flight in law, whereby he is liable to forfeit his goods, and though he afterwards renders himſelf on the exigent, and is found not guilty, 'tis ſaid the forfeiture ſhall ſtand: but if the party was in priſon, or beyond the ſeas, he, or his executors, may reverſe the award of the exigent, by writ of error. Upon all exigents, a proclamation ſhall be iſſued out to make proclamations in the county where the defendant dwells, for him to yield himſelf, *&c.*

EXIGENTERS, four officers in the court of Common Pleas, who make all exigents and proclamations, in all actions where proceſs of outlawry lies. Writs of ſuperſedeas, as well as the prothonotaries upon exigents, are likewiſe drawn up in their office.

EXILE, the ſame with baniſhment. See the article BANISHMENT.

EXILIUM, in law, ſignifies a ſpoiling; but ſeems to be reſtrained to the injury done to tenants by altering their tenure, ejecting them, *&c.*

EXILLES, a ſtrong fortreſs on the frontiers of Dauphine and Piedmont, about ten miles weſt of Suſa, and twenty-five north-weſt of Turin: eaſt long. 7°, north lat. 45° 5′.

EXISTENCE, that whereby any thing has an actual eſſence, or is ſaid to be. See the article ESSENCE.

Mr. Locke ſays, that we arrive at the knowlege of our own exiſtence, by intuition; of the exiſtence of God, by demonſtration; and of other things, by ſenſation. As for our own exiſtence, continues that great philoſopher, we perceive it ſo plainly, that it neither needs, nor is capable of, any proof. I think, I reaſon, I feel pleaſure and pain; can any of theſe be more evident to me than my own exiſtence? If I doubt of all other things, that very doubt makes me perceive my own exiſtence, and will not ſuffer me to doubt it. If I know I doubt, I have as certain a perception of the thing doubting, as of that thought which I call doubt: experience then convinces us, that we have an intuitive knowlege of our own exiſtence.

From the knowlege of our own exiſtence, Mr. Locke deduces his demonſtration of the exiſtence of a God. See the article GOD.

It has been a ſubject of great diſpute whether external bodies have any exiſtence but in the mind, that is, whether they really exiſt, or exiſt in idea only: the former opinion is ſupported by Mr. Locke, and the latter by Dr. Berkley. The knowledge of the exiſtence of other things, or things without the mind, we have only by ſenſation: for there being no neceſſary connection of real exiſtence with any idea a man hath in his memory, nor of any other exiſtence, but that of God, with the exiſtence of any particular man; no particular man can know the exiſtence of any other being but only, when, by operating upon him, it makes itſelf be perceived by him. The having the idea of any thing in our mind no more proves the exiſtence of that thing, than the picture of a man evidences his being in the world; or the viſions of a dream make a true hiſtory. It is therefore the actual receiving of ideas from without, that gives us notice of the exiſtence of other things, and makes us know that ſomething does exiſt at that time without us, which cauſes that idea in us, though perhaps we neither know nor conſider how it does it. This notice, which we have by our ſenſes of the exiſtence of things without us, though it be not altogether ſo certain as intuition and demonſtration, yet deſerves the name of knowlege, if we perſuade ourſelves that our faculties act, and inform us right concerning the exiſtence of thoſe objects that affect them: but beſides the aſſurance we have from our ſenſes themſelves, that they do not err in the information they give us of the exiſtence of things without us, we have other concurrent reaſons; as, firſt, It is plain theſe perceptions are produced in us by external cauſes affecting our ſenſes, becauſe thoſe that want the organs of any ſenſe never can have the ideas belonging to that ſenſe produced in their minds. Secondly, becauſe we find ſometimes that we cannot avoid the having thoſe ideas produced in our minds. When my eyes are ſhut, I can, at pleaſure, recal to my mind the ideas of light, or the ſun, which former ſenſations had lodged in my memory; but if I turn my eyes towards the ſun, I cannot avoid the ideas which the light or the ſun then produces in me; which ſhews a manifeſt difference between thoſe ideas laid up in the memory, and ſuch as force themſelves upon us, and we cannot avoid having: beſides, there is nobody who doth not perceive the difference in himſelf between actually looking on the ſun, and contemplating the idea he has of it in his memory; and therefore he hath certain knowlege that they are not both memory or fancy. Thirdly, add to this, that many ideas are produced in us with pain, which we afterwards remember without the leaſt offence: thus the pain of heat, or cold, when the idea of it is revived in our minds, give us no diſturbance, which when felt, was very troubleſome; and we remember the pain of hunger, thirſt, head ach, &c. without any pain at all, which would either never diſturb us, or elſe conſtantly do it, as often as we thought of it, were there no more but ideas floating in our minds, and appearances entertaining our fancies, without the real exiſtence of things affecting us from abroad. Fourthly, our ſenſes in many caſes bear witneſs to the truth of each others report concerning the exiſtence of ſenſible things without us: he that doubts when he ſees a fire, whether it be real, may, if he pleaſes, feel it too, and by the exquiſite pain, may be convinced that it is not a bare idea, or phantom. *Locke.*

Dr. Berkeley on the other hand contends, that external bodies have no exiſtence but in the mind perceiving them; or that they exiſt no longer, than they are perceived: his principal arguments, which ſeveral others, as well as himſelf, eſteem a demonſtration of this ſyſtem, are as follow. That neither our thoughts, paſſions, or ideas formed by the imagination, exiſt without the mind, is allowed; and that the various ſenſations impreſſed on the mind, whatever objects they compoſe, cannot exiſt otherwiſe than in a mind perceiving them, is equally evident. This appears from the meaning of the term exiſt, when applied to ſenſible things: thus, the table I write on, exiſts, *i. e.* I ſee and feel it; and were I out of my ſtudy, I ſhould ſay it exiſted, *i. e.* that were I in my ſtudy, I ſhould ſee and feel it as before. There was an odour, *i. e.* I ſmelt it, &c. but the exiſtence of unthinking beings without any relation to their being perceived is unintelligible: their *eſſe* is *percipi*. Then to ſhew that the notion of bodies is grounded on the doctrine of abſtract ideas, What, he aſks, are light and colours, heat and cold, extenſion and figure, in a word, the things we ſee and feel, but ſo many ſenſations, notions, ideas, or impreſſions on the ſenſe; and is it poſſible to ſeparate, even in thought, any of theſe from perception? The ſeveral bodies then, that compoſe the frame of the world, have not any ſubſiſtence without a mind: their *eſſe* is to be perceived or known; and if they are not perceived by me, nor by any other thinking being, they have no ſhadow of exiſtence at all: the things we perceive are colour, figure, motion, &c. that is, the ideas of thoſe things; but has an idea any exiſtence out of the mind? To have an idea is the ſame thing as to perceive; that, therefore, wherein colour, figure, &c. exiſt, muſt perceive them. It is evident, therefore, that there can be no unthinking ſubſtance, or ſubſtratum of thoſe ideas. But you may argue, if the ideas themſelves do not exiſt without the mind, there may be things like them, whereof they are copies or reſemblances, which exiſt without the mind. It is anſwered, an idea can be like nothing but an idea, a colour or figure can be nothing elſe but another colour or figure. It may be farther aſked, whether thoſe ſuppoſed original or external things, whereof our ideas are the pictures, be themſelves perceivable or not? If they be not, I appeal to any one whether it be ſenſe to ſay, a colour is like ſomewhat which is inviſible; hard or ſoft, like ſomewhat untangible, &c. Some diſtinguiſh between primary and ſecondary qualities, the former, *viz.* extenſion, ſolidity, figure, motion, reſt, and number, have a real exiſtence out of the mind; for the latter, under which come all other ſenſible qualities, as colours, ſounds, taſtes, &c. they allow the ideas we have of them are not reſemblances of any thing without the mind, or unperceived, but depend on the ſize, texture, motion, &c. of the minute particles of matter. Now it is certain, that thoſe primary qualities are inſeparably united with the other ſecondary ones, and cannot even in thought be abſtracted from them; and, therefore, muſt only exiſt in the mind. Again, great or ſmall, ſwift or ſlow, are allowed to exiſt no where without the mind, being merely relative, and changing, as the frame or poſition of the organ changes: the extenſion, therefore, that exiſts without the mind, is neither great nor ſmall; the motion, neither ſwift nor ſlow, *i. e.* they are nothing. That number is a creature of the mind

is

Fig. 1. EXOCŒTUS, the *FLYING-FISH.*

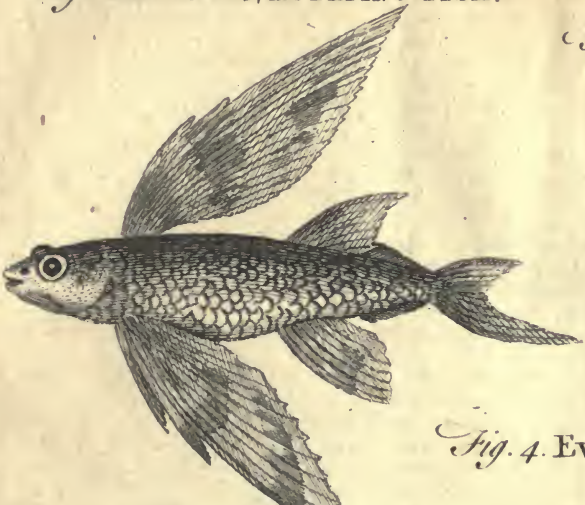


Fig. 2. EXTREME.

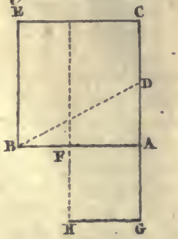


Fig. 4. EVOLUTE.

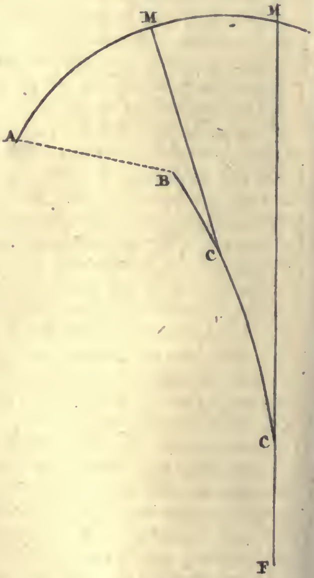


Fig. 3. EXCENTRICITY.

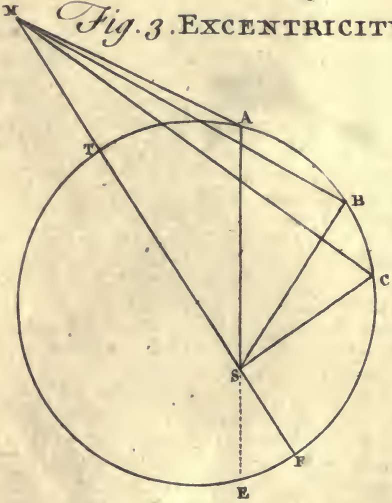
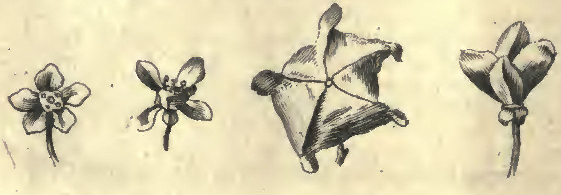


Fig. 5. EUONYMUS, the *SPINDLE-TREE.*



T. Jefferys sculp.

is plain (even though the other qualities were allowed to exiſt) from this, that the ſame thing bears a different denomination of number as the mind views it with different reſpects: thus the ſame extenſion is 1, 3, or 36, as the mind conſiders it, with reference to a yard, a foot, or an inch.

In effect, after the ſame manner, as the modern philoſophers prove colours, taſtes, *&c.* to have no exiſtence in matter, or without the mind, the ſame thing may be proved of all ſenſible qualities whatever: thus they ſay, heat and cold are only the affections of the mind, not at all patterns of real beings exiſting in corporeal ſubſtances, for that the ſame body which ſeems cold to one hand ſeems warm to another. Now why may we not as well argue that figure and extenſion are not patterns or reſemblances of qualities exiſting in matter, becauſe, to the ſame eye, at different ſtations, or to eyes of different ſtructure, at the ſame ſtation, they appear various. Again, ſweetneſs, it is proved, does not exiſt in the thing ſapid, becauſe the thing remaining unaltered, the ſweetneſs is changed to bitterneſs, as in a fever, or by an otherwiſe vitiated palate. Is it not as reaſonable to ſay, that motion does not exiſt out of the mind, ſince if the ſucceſſion of ideas in the mind become ſiniſter, the motion, it is acknowledged, will appear ſlower, without any external alteration. Again, were it poſſible for ſolid figured bodies to exiſt out of the mind, yet it were impoſſible for us ever to know it: our ſenſes, indeed, give us ſenſations of ideas, but do not tell us that any thing exiſts without the mind, or unperceived, like thoſe which are perceived; this the materialiſts allow. No other way, therefore, remains, but that we know them by reaſon's inferring their exiſtence from what is immediately perceived by ſenſe: but how ſhould reaſon do this, when it is confeſſed there is not any neceſſary connection between our ſenſations and theſe bodies. It is evident from the phænomena of dreams, phrenſies, *&c.* that we may be affected with the ideas we now have, though there were no bodies exiſting without them; nor does the ſuppoſition of external bodies at all forward us in conceiving how our ideas ſhould come to be produced.

As to the exiſtence of ſpirits, Mr. Locke ſays, that our having ideas of them does not make us know that any ſuch things do exiſt without us, or that there are any finite ſpirits, or any other ſpiritual beings but the eternal God. We have ground from revelation, and ſeveral other reaſons, to believe with aſſurance that there are ſuch creatures; but our ſenſes not being able to diſcover them, we want the means of knowing their particular exiſtence; for we can no more know that there are finite ſpirits really exiſting by the idea we have of ſuch beings, than by the ideas any one has of fairies or centaurs, he can come to know that things anſwering thoſe ideas do really exiſt.

EXIT, *exitus*, in law, properly ſignifies iſſue or offspring; but is alſo applied to iſſues, annual rents, and profits of lands.

EXIT, in a theatrical ſenſe, the action of a player in going off the ſtage, after he has played his part.

To do this with propriety, or in a manner ſuitable to the occaſion, is by no means the leaſt difficult part of a player's office.

EXLEGALITUS, among lawyers, the ſame with an outlawed perſon. See the article OUTLAW.

EX MERO MOTU, a formula uſed in the king's charters and letters patent, ſignifying that he grants them of his own will and motion.

It is intended to bar all exceptions that might be taken to the charter or patent, by alledging the king, in granting them, was abuſed by falſe ſuggeſtions.

EXOCATACOELI, in church hiſtory, a general name by which ſeveral great officers in the church of Conſtantinople were called, as the grand maſter of the chapel, the grand ſteward, *&c.*

They were of great authority in public aſſemblies, and even had the precedence of biſhops.

EXOCOETUS, the FLYING-FISH, in ichthiology, conſtitutes a diſtinct genus of fiſhes of the malacopterygious or ſoft-finned order: it has ten ſmall bones in the membrane of the gills; the pectoral fins are extremely long, and ſituated juſt below the extremity of the covering of the gills on the ſides, but elevated towards the back: they almoſt equal the whole body of the fiſh in length, which greatly reſembles an herring, both in ſhape and colour. See plate XCIV. fig. 1.

It is caught in the Mediterranean, and

other

other ſeas, and is called by different authors exocœtus, exochinus, hirundo piſcis, and mugil alatus.

When purſued by any fiſh of prey, it throws itſelf into the air, where it not only ſuſpends itſelf, but moves very nimbly forwards by means of its long fins, ſo long as they continue wet.

EXODIARY, *exodiarius*, in the antient roman tragedy, was the perſon who after the drama or play was ended, ſung the exodium. See the article EXODIUM.

EXODIUM, in the antient greek drama, one of the four parts or diviſions of tragedy, being ſo much of the piece as included the cataſtrophe and unravelling of the plot, and anſwering nearly to our fourth and fifth acts. See EPILOGUE.

Exodium, among the Romans, conſiſted of certain humorous verſes rehearſed by the exodiarius at the end of the Fabulæ Atellanæ.

EXODIUM, εξοδιον, in the ſeptuagint ſignifies the end or concluſion of a feaſt. Particularly it is uſed for the eighth day of the feaſt of tabernacles, which, it is ſaid, had a ſpecial view of the commemoration of the Exodus or departure out of Egypt.

EXODIUM was alſo the name of a ſong ſung at the concluſion of a feaſt.

EXODUS, a canonical book of the Old Teſtament; being the ſecond of the pentateuch, or five books of Moſes.

It is alſo called, from the greek εξοδος, going out or departure of the children of Iſrael from the land of Egypt; the hiſtory of which is delivered in this book, together with the many miracles wrought on that occaſion.

EX OFFICIO, among lawyers, ſignifies the power a perſon has, by virtue of his office, to do certain acts without being applied to. Thus a juſtice of peace may ex officio, at his diſcretion, take ſurety of the peace, without complaint made by any perſon whatſoever.

There was formerly an oath ex officio, whereby a ſuppoſed offender was compelled in the eccleſiaſtical court to confeſs, accuſe, or clear himſelf of a crime; but this law is repealed.

EXOMPHALUS, εξομφαλος, in ſurgery, called alſo omphalocele, and hernia umbilicalis, is a preternatural tumour of the abdomen at the navel from the rupture, or diſtenſion of the parts which inveſt that cavity. Theſe ruptures differ by their ſize and figure, ſome being ſmall, eſpecially when recent, others large and ſometimes monſtrous. Some are of a round figure, others acuminated, and Heiſter mentions an exomphalus in a woman with child, which reſembled the ſize and figure of the penis.

Umbilical ruptures are again diſtinguiſhed according to their contents, as if from the inteſtines, enteromphalocele; from the omentum epiplomphalocele; and if from air or wind, pneumatomphalocele: Some of theſe tumours are again diſtinguiſhed by their conſiſtence into hard or ſoft, returnable or not, painful or incarcerated.

An exomphalus ariſes from various cauſes; but the immediate cauſe is always ſome force exerted upon the abdomen, eſpecially near the navel, ſuch as a violent and ſudden motion, a fall, a violent blow, or leap, ſtrong coughing or ſneezing, ſtraining to lift great weights, difficult labour in women, &c. by which cauſes the peritonæum at the navel is either dilated, or as it ſometimes happens, entirely broke off. The method of cure is twofold, according as the inteſtines are returnable into the abdomen or not. If the firſt can be practiſed, it ſhould be done without any delay, and the parts ſecured againſt a future relapſe by a girdle or bandage. But if the inteſtine cannot be returned through the ſtraitneſs of the aperture in the peritonæum, and the patient is tortured with violent pain in the part affected, with vomiting, and other bad ſymptoms, to apply the bandage in that caſe would not only be uſeleſs, but pernicious: the patient ſhould rather be treated with emollient clyſters and cataplaſms, to relax the parts, and facilitate their return; and if he is inclined to be feveriſh, it may then be proper to bleed, as in other inflammatory diſtempers, by which means the diſtended veſſels of the inteſtine will be contracted, and probably afterwards returned by a gentle preſſure of the hands, to be then ſecured with compreſs, bandage, and a proper inſtrument. If the diſorder becomes ſtill worſe, after bleeding and the uſe of other medicines, the ſurgeon ſhould then proceed to the operation, which conſiſts chiefly in dilating the wound of the abdomen ſo as to make it large enough to return the inteſtine: for this purpoſe he makes a tranſverſe inciſion through the integuments, and if the tumour be large, a crucial inciſion, taking great care not to injure the inteſtine; then the peritonæum, which immediately inveſts the inteſtine, may be dilated with as ſmall an inciſion as poſſible, and the inteſtine afterwards returned into the abdomen. See the article HERNIA.

EXONERATIONE SECTÆ, in law, a writ which formerly lay, to free the king's ward from all ſuit to courts. See the article WARD.

EXORCISM, ἐξορκισμὸς, among eccleſiaſtical writers, the expelling devils from perſons poſſeſſed, by means of conjurations and prayers. See CONJURATION.

Exorciſm makes a conſiderable part of the ſuperſtition of the church of Rome, the rituals of which forbid the exorciſing any perſon without the biſhop's leave.

The ceremony is performed at the lower end of the church, towards the door. The exorciſt firſt ſigns the poſſeſſed perſon with the ſign of the croſs, makes him kneel, and ſprinkles him with holy water. Then follow the litanies, pſalms, and prayer; after which the exorciſt aſks the devil his name, and adjures him by the myſteries of the chriſtian religion, not to afflict the perſon any more: then, laying his right hand on the dæmoniac's head, he repeats the form of exorciſm, which is this: "I exorciſe thee, unclean ſpirit, "in the name of Jeſus Chriſt: tremble, "O ſatan! thou enemy of the faith, thou "foe of mankind, who haſt brought "death into the world, who haſt deprived men of life, and haſt rebelled againſt "juſtice; thou ſeducer of mankind, "thou root of evil, thou ſource of avarice, diſcord and envy."

The romaniſts likewiſe exorciſe houſes and other places, ſuppoſed to be haunted by unclean ſpirits; and the ceremony is much the ſame with that for perſons poſſeſſed.

EXORCISTS, in church-hiſtory, an order of men, in the antient church, whoſe employment it was to exorciſe or caſt out devils. See the preceding article.

EXORDIUM, in rhetoric, is the preamble or beginning, ſerving to prepare the audience for the reſt of the diſcourſe.

Exordiums are of two kinds, either juſt and formal, or vehement and abrupt. The laſt are moſt ſuitable on occaſions of extraordinary joy, indignation, or the like.

All exordiums ſhould be compoſed with a view to captivate the good will, or attract the attention of the audience. The firſt may be done by paying them ſome compliment: thus St. Paul, *I think myſelf happy, king Agrippa, becauſe I ſhall anſwer for myſelf this day before thee, touching all the things whereof I am accuſed of the Jews, eſpecially becauſe I know thee to be expert in all cuſtoms and queſtions which are among the Jews.*

Attention is procured by promiſing to treat ſome weighty, uſeful, pleaſant, or ſurpriſing ſubject: and thus Horace, Ode i. lib. 3.

> *Favete linguis: carmina non prius*
> *Audita, muſarum ſacerdos,*
> *Virginibus puerïſque canto.*

The requiſites in an exordium are, 1. Propriety, whereby it becomes of a piece with the ſubject, and matches it as a part does a whole: in this the Greeks were very defective. 2. Modeſty which very much recommends the orator to the favour of his audience. And, 3. Brevity, not amplified or ſwelled with a detail of circumſtances.

The ſtyle ſhould not be too much raiſed, nor ſhould it run into bombaſt: and, above all things, the vain glory ſhould be avoided of that author, who, according to Horace, began his poem thus,

Fortunam Priami cantabo & nobile bellum.

See the article PROPOSITION.

It was forbidden to make exordiums in the areopagus at Athens, as it is an indirect and imperceptible manner of prepoſſeſſing the audience.

EXOSTOSIS, in ſurgery, a preternatural eminence or excreſcence of a bone, whether attended with an eroſion or not.

When an exoſtoſis is attended with no bad ſymptoms, it is beſt to let it alone, as the remedy will be worſe than the diſeaſe. But if it occaſions great deformity, impedes any action, or produces pain or other miſchiefs, it may be removed in the manner directed under the article SPINA VENTOSA.

EXOTIC, an appellation denoting a thing to be the produce of foreign countries.

Exotic plants of the hot climates are very numerous, and require the utmoſt attention of the gardiner to make them thrive with us. See the articles STOVE and GREEN-HOUSE.

EXPANSION, among metaphyſicians, denotes the idea we have of laſting diſtance, all whoſe parts exiſt together.

EXPANSION, in phyſiology, the ſwelling or increaſe of the bulk of bodies when heated. See the article HEAT.

Dr. Halley found boiling water to expand one twenty-ſixth part of its former bulk: but with a moderate heat, its expanſion was imperceptible. Mercury, with a very gentle heat, expanded one ſeventy-fourth of its uſual bulk when cold. Spirit of wine, with a heat much leſs than that of boiling water, expanded itſelf to a twelfth part of its bulk, when cold, and then fell a boiling and emitting bubbles copiouſly. Mr. Boyle, in his book Of Cold, tells us, he found the expanſion of water by freezing to be about a tenth part of a ſpace more than the water uſually takes up. See FREEZING.

Dr. Gregory ſhews, that if a globule of air, only one inch in diameter, had ſo great an expanſion as it would have at a ſemi-diameter of the earth from its ſurface, it would fill all the planetary regions, as far as, and even beyond the ſphere of ſaturn. See the article AIR.

But beſides fluids, the moſt ſolid bodies are expanded by heat, though not in the inverſe ratio of their ſpecific gravities or coheſion, nor even in the ratio compounded of both. The degree of expanſion ſeems rather to depend on the different arrangement, magnitude, and figure of their component parts. According to profeſſor Muſchenbroek, the expanſions of metals in the ſame degree of heat, are as follows, *viz.* ſilver 78, iron 80, copper 89, braſs 110, tin 153, lead 155. As to the time of their beginning to expand, it is found to be in the following order, *viz.* tin firſt, then lead, ſilver, braſs, copper, and, laſt of all, iron; the reaſon of which is thought to depend upon the different ſtructures of their pores, and their being more or leſs fitted to admit the influence of the fire.

For the expanſion of the metalline rods of pendulums, and how remedied, ſee the article PENDULUM.

EX PARTE, a term uſed in the court of chancery, where a commiſſion is taken out and executed by one ſide or party only, upon the other party's neglecting or refuſing to join therein.

When both the parties proceed together, it is called a joint commiſſion.

EX PARTE TALIS, a writ that lies for a bailiff or receiver, that having auditors aſſigned to paſs his accounts, cannot procure from them reaſonable allowance, but is caſt into priſon; in which caſe the practice is to ſue this writ out of the chancery, directed to the ſheriff to take the four mainpernors to bring his body before the barons of the exchequer, at a certain day, and to warn the lord to appear at the ſame time.

EXPECTANT, in law, ſignifies having relation to, or depending on: thus, where land is given to a man and his wife, and to their heirs, they have a fee ſimple eſtate; but if it be given to them and the heirs of their bodies begotten, they have an eſtate tail, and a fee expectant, which is oppoſed to fee ſimple.

EXPECTATIVE, in the canon-law, an expectation grounded on the promiſe of having the next benefice that ſhall become vacant; or a right to the reverſion of the next benefice. See BENEFICE.

EXPECTATIVE GRACES, *gratiæ expectativæ*, bulls antiently given by the popes, for obtaining ſome benefices that ſhould become vacant.

Theſe bulls were very mortifying to biſhops, becauſe they encroached on their privileges: beſides, they were odious as they induced people to wiſh the death of others. The council of Trent annulled all expectatives; but the canons relating thereto were never admitted in France, where the right of conferring expectative graces is one of the king's prerogatives.

EXPECTORANTS, in pharmacy, medicines which promote expectoration. See the next article.

Theſe medicines are very numerous: the moſt conſiderable in the vegetable kingdom are the roots of elecampane, arum, florentine orris, and liquorice; the herbs paul's betony, chervil, ſcabious, mouſe-ear, germander, hyſſop, and tarragon; the flowers of violets, mallows, red poppies, and ſaffron; the ſeeds of aniſe and fennel; the bark of ſaſſafras: and among reſinous gums, benjamin and gum ammoniac: among fruits, raiſins, figs, jujubes, and pine-kernels: honey, liquorice juice, and oil of ſweet almonds: among animal ſubſtances, ſperma ceti and fats: among mineral ſubſtances, ſulphur, together with its flowers and milk: among compound ſubſtances, the aniſated ſpirit of ſal ammoniac, the lohock ſanum, the ſyrup prepared of the lungs of a fox, the pectoral elixir, and the aſthmatic ſpirit of Michaeli.

EXPECTORATION, the act of evacuating or bringing up phlegm, or other matters out of the trachea, lungs, *&c.* by coughing, hauking, ſpitting, *&c.* in order to which there are four things neceſſary; 1. That the matter contained there, be moveable and penetrable, ſo that its moſt fluid parts may not be diſſipated, and the matter that remains become viſcid, tough, and inextricable. 2. That the paſſages may be opened and lubricated. 3. That the matter be provoked to excretion. 4. That the ſtuffed veſſels may be at reſt, ſo as to become capable of relaxation; for if they are continually irritated, the moiſture will be always thrown out of the glands of the aſpera arteria with a ſenſe of pain. See the preceding article.

EXPEDITATE, in the foreſt-law, ſignifies to cut out the balls of a great dog's feet, belonging to people near the foreſt, for the preſervation of the king's game: yet the ball of the foot of a maſtiff is not to be cut out, but only the three claws of the fore foot.

Every perſon keeping a dog that is not expeditated, forfeits 3 s. 4 d.

EXPENDITORS, the perſon who diſburſe or expend the money collected by the tax for repairs of ſewers, after the ſame is paid into their hands by the collectors, as ordered by the commiſſioners, and for which they are to render accounts when required.

EXPENSIS LITIS, COSTS *of ſuit*. See the article COSTS.

EXPENSIS MILITUM LEVANDIS, a writ antiently directed to the ſheriff, for levying the allowance for knights of the ſhire; and, Expenſis militum non levandis, was a writ to hinder the ſheriff from levying ſuch allowance upon lands that held in antient demeſne.

EXPERIENCE, a kind of knowlege acquired by long uſe, without any teacher. Mr. Locke ſays that men receive all the materials of knowlege from experience and obſervation. See the article IDEA.

Experience then conſiſts in the ideas of things we have ſeen or read, which the judgment has reflected on, to form itſelf a rule or method.

Chauvinus enumerates three kinds of experience; the firſt is the ſimple uſe of the external ſenſes, whereby we perceive the phænomena of natural things, without any direct attention thereto, or making any application thereof. The ſecond is when we premeditately and deſignedly make trials of various things, or obſerve thoſe done by others, attending to all the effects and circumſtances. The third is that preceded by a foreknowlege, or, at leaſt an apprehenſion of the event, and determines whether the apprehenſion were true or falſe.

EXPERIMENT, in philoſophy, is the trial of the reſult or effect of the applications and motions of certain natural bodies, in order to diſcover ſomething of their motions and relations, whereby to aſcertain ſome of their phænomena, or cauſes. See the article EXPERIMENTAL PHILOSOPHY.

Torricellian EXPERIMENT. See the article TORRICELLIAN.

EXPERIMENTAL PHILOSOPHY, that philoſophy which proceeds on experiments, which deduces the laws of nature, and the properties and powers of bodies, and their actions upon each other, from ſenſible experiments and obſervations. The buſineſs of experimental philoſophy is to enquire into and to inveſtigate the reaſons and cauſes of the various appearances or phænomena of nature, and to make the truth or probability thereof obvious and evident to the ſenſes, by plain, undeniable, and adequate experiments, repreſenting the ſeveral parts of the grand machinery and agency of nature.

In our enquiries into nature, we are to be conducted by thoſe rules and maxims which are found to be genuine, and conſonant to a juſt method of phyſical reaſoning; and theſe rules of philoſophizing are by the greateſt maſter in ſcience, ſir Iſaac Newton, reckoned four, which are as follows:

1. More cauſes of natural things are not to be admitted, than are both true, and ſufficient to explain the phænomena; for nature does nothing in vain, but is ſimple, and delights not in ſuperfluous cauſes of things.

2. And, therefore, of natural effects of the ſame kind, the ſame cauſes are to be aſſigned, as far as it can be done: as of reſpiration in man and beaſts, of the deſcent of ſtones in Europe and America, of light in a culinary fire and in the ſun, and of the reflection of light in the earth and in the planets.

3. The qualities of natural bodies which cannot be increaſed or diminiſhed, and agree to all bodies in which experiments can be made, are to be reckoned as the qualities of all bodies whatſoever: thus, becauſe extenſion, diviſibility, hardneſs, impenetrability, mobility, the vis intertiæ, and gravity are found in all bodies which fall under our cognizance or inſpection, we may juſtly conclude they belong to all bodies whatſoever, and are therefore to be eſteemed the original and univerſal properties of all natural bodies.

4. In experimental philoſophy, propoſitions collected from the phænomena by induction, are to be deemed (notwith-

ſtanding contrary hypotheſes) either exactly or very nearly true, till other phænomena occur, by which they may be rendered either more accurate, or liable to exception. This ought to be done, leſt arguments of induction ſhould be deſtroyed by hypotheſes.

Theſe four rules of philoſophizing are premiſed by ſir Iſaac Newton to his third book of the Principia; and more particularly explained by him in his Optics, where he exhibits the method of proceeding in philoſophy, the firſt part of which is as follows.

As in mathematics, ſo in natural hiſtory, the inveſtigation of difficult things, by way of analyſis, ought always to precede the method of compoſition. This analyſis conſiſts in making experiments and obſervations, and in drawing general concluſions from them by induction (*i. e.* reaſoning from the analogy of things by natural conſequence) and admitting no objections againſt the concluſions, but what are taken from experiments or certain truths. And although the arguing from experiments and obſervation, by induction, be no demonſtration of general concluſions, yet it is the beſt way of arguing which the nature of things admits of, and may be looked on as ſo much the ſtronger, by how much the induction is more general; and if no exception occur from phænomena, the concluſion may be pronounced generally; but if at any time afterwards, any exception ſhall occur from experiments, it may then be pronounced with ſuch exceptions: by this way of analyſis we may proceed from compounds to ingredients, and from motions to the cauſes producing them; and, in general, from effects to their cauſes; and from particular cauſes to more general ones, till the argument ends in the moſt general: this is the method of analyſis. And that of ſyntheſis, or compoſition, conſiſts in aſſuming cauſes, diſcovered and eſtabliſhed as principles, and by them explaining the phænomena, proceeding from them, and proving the explanations. See ANALYSIS, SYNTHESIS, SUBSTANCE, ELEMENT, WATER, VAPOUR, *&c.*

EXPERIMENTUM CRUCIS, a capital, leading, or deciſive experiment; thus termed, either on account of its being like a croſs, or direction poſt, placed in the meeting of ſeveral roads, guiding men to the true knowlege of the nature of that thing they are enquiring after; or, on account of its being a kind of torture, whereby the nature of the thing is as it were extorted by force.

EXPIATION, a religious act, by which ſatisfaction, attonement, or amends is made for the commiſſion of ſome crime, the guilt done away, and the obligation to puniſhment cancelled.

The method of expiation, among the Jews, was chiefly by ſacrifice, whether for ſins of ignorance, or to purify themſelves from certain pollutions; as a woman after child-birth, a leper after cleanſing, *&c.* See the articles SACRIFICE and PURIFICATION.

Great day of EXPIATION, an annual ſolemnity of the Jews, upon the tenth day of the month Tiſri, which anſwers to our September. On this occaſion the high prieſt laid aſide his breaſt-plate and embroidered ephod, as being a day of humiliation. He firſt offered a bullock and a ram for his own ſins, and thoſe of the prieſts; then he received from the heads of the people two goats for a ſin-offering, and a ram for a burnt offering, to be offered in the name of the whole multitude. It was determined by lot which of the goats ſhould be ſacrificed, and which ſet at liberty. After this he perfumed the ſanctuary with incenſe, and ſprinkled it with blood: then, coming out, he ſacrificed the goat, upon which the lot had fallen. This done, the goat, which was to be ſet at liberty, being brought to him, he laid his hands upon its head, confeſſed his ſins, and the ſins of the people, and then ſent him away into ſome deſart place: it was called azazel, or the ſcape-goat. See the article SCAPE-GOAT.

As to the expiations among the heathens, they were of ſeveral kinds, as ſacrifices and religious waſhings.

EXPIATION, in a figurative ſenſe, is applied by divines to the pardon procured to mens ſins, by the merits of Chriſt's death.

EXPILATION, among civilians, the carrying off, or ſequeſtring, ſomething belonging to an inheritance, before the heir had intermeddled therewith.

EXPILATION alſo denoted a robbery committed by night, and ſo called from the robbers ſtripping people of their cloaths.

EXPIRATION, in phyſic, that part of reſpiration whereby the air is expelled, or driven out of the lungs. See the article RESPIRATION.

Expiration, in chemiſtry, is applied to all ſorts of evaporation, and ſubtile effluvia, that go off into the air.

Expiration is alſo uſed for the end of any term agreed upon. It likewiſe ſignifies death.

EXPLICITE, in the ſchools, ſomething clear, diſtinct, formal, and unfolded.

EXPLOSION, in phyſics, is properly applied to the going off of gun-powder and the report made thereby. Hence it is uſed to expreſs ſuch ſudden actions of bodies, as generate air inſtantaneouſly, thus, half a dram of carraway-ſeed, poured upon a dram of the compound ſpirit of nitre, in an empty receiver, produced ſuch a prodigious quantity of air as to blow up with an exploſion a receiver of ſix inches in diameter and eight inches deep; the preſſure, therefore, of the atmoſphere on the exhauſted receiver, which it overcomes, is above 400 ℔ reckoning 15 ℔ to a ſquare inch. From the experiments in Mr. Robins's New principles of Gunnery, it appears, that the force of fired gun-powder, at the inſtant of its exploſion, is the ſame as that of an elaſtic fluid of a thouſand times the denſity of common air. See Gun-powder.

EXPONAS vendITIONI. See the article Venditioni exponas.

EXPONENT, in algebra, is a number placed over any power or involved quantity, to ſhew to what height the root is raiſed: thus, 2 is the exponent of x^2, and 4 the exponent of x^4, or $xxxx$.

We have obſerved, under the article Division, in algebra, that the rule for dividing powers of the ſame quantity, is to ſubtract the exponents, and make the difference the exponent of the quotient: if, therefore, a leſſer power is divided by a greater, the exponent of the quotient; muſt, by this rule, be negative: thus, $\frac{a^4}{a^6}=a^{4-6}=a^{-2}$. But $\frac{a^4}{a^6}=\frac{1}{a^2}$; and hence $\frac{1}{a^2}$ is expreſſed by a^2, with a negative exponent. It is alſo obvious that $\frac{a}{a}=a^{1-1}=a^0$; but $\frac{a}{a}=1$, and therefore $a^0=1$. After the ſame manner, $\frac{1}{a}=\frac{a^0}{a}=a^{0-1}=a^{-1}$; $\frac{1}{aa}=\frac{a^0}{a^2}=a^{0-2}=a^{-2}$; $\frac{1}{aaa}=a^{0-3}=a^{-3}$; ſo that the quantities, a, 1, $\frac{1}{\,}$ $\frac{1}{a^2}$ $\frac{1}{a^3}$ $\frac{1}{a^4}$, &c. may be expreſſed thus, a^1, a^0, a^{-1}, a^{-2}, a^{-3}, a^{-4}, &c. Theſe are called the negative powers of a, which have negative exponents; but they are at the ſame time poſitive powers of $\frac{1}{a}$, or a^{-1}. See the articles Powers and Involution.

Exponent *of a ratio*, is the quotient ariſing from the diviſion of the antecedent by the conſequent: thus, in the ratio of 5 to 4, the exponent is $1\frac{1}{4}$; but the exponent of 4 : 5, is $\frac{4}{5}$.

If the conſequent be unity, the antecedent itſelf is the exponent of the ratio: thus the exponent of the ratio 4 : 1 is 4. Wherefore the exponent of a ratio is to unity as the antecedent is to the conſequent. Altho' the quotient of the diviſion of the antecedent by the conſequent is uſually taken for the exponent of a ratio, yet in reality the exponent of a ratio ought to be a logarithm. And this ſeems to be more agreeable to Euclid's definition of duplicate and triplicate ratios, in his fifth book. For 1, 3, 9, are continual proportionals; now if $\frac{1}{3}$ be the exponent of the ratio of 1 to 3, and $\frac{3}{9}$ or $\frac{1}{3}$ the exponent of the ratio of 3 to 9; and $\frac{1}{9}$ the exponent of the ratio of 1 to 9; and ſince, according to Euclid, if three quantities be proportional, the ratio of the firſt to the third is ſaid to be the duplicate of the ratio of the firſt to the ſecond, and of the ſecond to the third; therefore according to this, $\frac{1}{9}$ muſt be the double of $\frac{1}{3}$, which is very falſe. But it is well known, the logarithm of the ratio of 1 to 9, that is, the logarithm of 9, is the double of the ratio of 1 to 3, or 3 to 9, that is, the logarithm of 3. From whence it appears that logarithms are more properly the exponents of ratios, than numerical quotients; and Dr. Halley, Mr. Cotes, and others, are of the ſame opinion.

Exponent, is alſo uſed in arithmetic, in the ſame ſenſe as index or logarithm. See Index and Logarithm.

EXPONENTIAL calculus. See the article Calculus exponentialis.

Exponential curve is that whoſe nature is expreſſed by an exponential equation. The area of any exponential curve whoſe nature is expreſſed by this exponential equation $x^x=y$ (making $1+v=x$) will be $\frac{1}{0.1.2}v^2+\frac{1}{0.1.2.3}v^3-$

$\frac{1}{0.\,1.\,2.\,3.\,4.}v^4 + \frac{1}{0.\,1.\,2.\,3.\,4.\,5.}v^5 - \frac{1}{0.1.2.3.4.5.6.}$, v^6, *&c.* See the article Calculus exponentialis.

Exponential equation is that wherein there is an exponential quantity. See the next article.

Exponential quantity is a quantity whoſe power is a variable quantity, as x^x, a^x. Exponential quantities are of ſeveral degrees and orders, according as the exponents themſelves are more or leſs involved. If the exponent be a ſimple quantity, as z^y, it is called an exponential of the firſt or loweſt degree; but when the exponent itſelf is an exponential of the firſt degree, as z^{y^x} it is called an exponential of the ſecond degree. In like manner, if the exponent itſelf be an exponential of the ſecond degree, as $x^{y^{x^o}}$, it is called an exponential of the third degree, *&c.*

EXPORTATION, the ſhipping and carrying out of the kingdom wares and commodities, for other countries.

Exportation is part of foreign commerce, diſtinguiſhed by the appellation active or ſelling part, in oppoſition to importation, which is called the paſſive, or buying part. Belloni obſerves, that commerce, when active, muſt produce a vaſt flow of riches, the balance being always received in money; whereas, if it be paſſive, the moſt immenſe treaſures will be ſoon exhauſted, as the balance of trade muſt be continually made good out of the remaining coin. Hence plenty of money in any place, implies that the quantity of goods exported far exceeds that of goods imported; and wherever we ſee money ſcarce, we may conclude that greater quantities of goods have been imported then exported. See Commerce, Money, and Exchange.

EXPOSITION, in general, denotes the ſetting a thing open to public view: thus it is the romaniſts ſay, the hoſt is expoſed, when ſhewn to the people.

Exposition *of children*, among the antients, a barbarous cuſtom of laying down children by the ſides of the highway, and other places moſt frequented, where they were left at the mercy of the public, and and muſt unavoidably periſh, unleſs taken up and educated by charitable and compaſſionate perſons.

Many expoſed their children merely becauſe they were not in a condition to educate them; and as for thoſe who expoſed them for other reaſons, they commonly did it with jewels, with a view no doubt to encourage thoſe who found them to take care of their education if alive, or give them human burial, if dead.

Exposition, in a literary ſenſe, the explaining an author, paſſage, writing, or the like, and ſetting their meaning in an obvious and clear light.

Expoſition of deeds, of all kinds, ought to be according to the true intent thereof, and reaſonable and equal. See Deed.

EXPOSITOR, or Expository, a title given to ſmall dictionaries, ſerving to explain the hard words of a language.

EX POST facto, in law, ſomething done after another: thus an eſtate granted may be good by matter ex poſt facto, that was not ſo at firſt, as in caſe of election.

EXPOSTULATION, in rhetoric, a warm addreſs to a perſon, who has done another ſome injury, repreſenting the wrong in the ſtrongeſt terms, and demanding redreſs.

EXPOSURE, in gardening, the ſituation of a garden, wall, or the like, with reſpect to the points of the compaſs, as ſouth or eaſt.

According to Mr. Miller, the beſt aſpect or expoſure for walls, in England, is to have one point to the eaſt-ward of the ſouth; by reaſon theſe will enjoy the benefit of the morning ſun, and be leſs expoſed to injuries from the weſt and ſouth-weſt winds, than walls directly facing the ſouth. The next beſt aſpect is due ſouth, and the next to that ſouth-eaſt, which is preferable to the ſouth-weſt, for the reaſons before aſſigned. However, as there will, for the moſt part, be ſouth-weſt and weſt walls in every garden, theſe may be planted with ſuch ſorts of fruit as do not require ſo much heat to ripen them; and wherever there are north walls, they are only fit for baking pears and plums, morello-cherries for preſerving, or ſome duke cherries may be thus continued longer in the ſeaſon. See the articles Garden, Planting, *&c.*

EXPRESS, ſomething that is determinate and preciſe, or in ſuch formal terms as leaves no room for doubt.

Express alſo denotes a courier. See the article Courier.

EXPRESSED oils, in chemiſtry, ſuch oils as are obtained from bodies only by preſſing. See the article Oil.

EXPRESSION, in chemiſtry, or pharmacy, denotes the act of expreſſing out the juices or oils of vegetables, which is one of the three ways of obtaining them; the other two being by infuſion and decoction.

Oils obtained by means of fire, are called ſtillatitious.

EXPRESSION, in rhetoric, the elocution, diction, or choice of words in a diſcourſe. Beautiful expreſſion is the natural and true light of our thoughts: it is to this we owe all the excellencies in diſcourſe; which gives a kind of vocal life and ſpirit. As the principal end of diſcourſe is to be underſtood, the firſt thing we ſhould endeavour to obtain is a richneſs of expreſſion, or habit of ſpeaking ſo well as to make our thoughts eaſily underſtood. See STYLE, TROPE, RHETORIC, *&c.*

EXPRESSION, in painting, a natural and lively repreſentation of the ſubject, or of the ſeveral objects intended to be ſhewn.

The expreſſion conſiſts chiefly in repreſenting the human body and all its parts, in the action ſuitable to it: in exhibiting in the face the ſeveral paſſions proper to the figures, and obſerving the motions they impreſs on the external parts. See the article ATTITUDE.

The term expreſſion is frequently confounded with that of paſſion, but they differ in this, that expreſſion is a general term, implying a repreſentation of an object agreeably to its nature and character, and the uſe or office it is to have in the work; whereas paſſion, in painting, denotes a motion of the body, accompanied with certain diſpoſitions or airs of the face, which work an agitation in the ſoul: ſo that every paſſion is an expreſſion, but not every expreſſion a paſſion.

The laws of EXPRESSION. Expreſſion being a repreſentation of things according to their character, may be conſidered either with reſpect to the ſubject in general, or to the paſſions peculiar thereto.

Firſt, with reſpect to the ſubject, it is to be obſerved, 1. That all the parts of the compoſition are to be transformed or reduced to the character of the ſubject, ſo as they may conſpire to impreſs the ſame ſentiment, paſſion, or idea. 2. In order to this, if any circumſtance occur in hiſtory or deſcription, that would avert or take from the idea, it muſt be ſuppreſſed, unleſs eſſential to the ſubject. 3. To this end the hiſtory or fable is to be well ſtudied in the authors who deſcribe it, in order to conceive its nature and character truly, and impreſs it ſtrongly on the imagination, that it may be diffuſed and carried through all the parts of the ſubject. 4. A liberty may be taken, to chooſe favourable incidents, in order to diverſify the expreſſion, provided they are not contrary to the principal image of the ſubject, or the truth of hiſtory. 5. The harmony of the *tout enſemble* ought to be particularly regarded, both with reſpect to the actions and the light and colour. See CLARO-OBSCURO. 6. The modes and cuſtoms are to be obſerved, and every thing made conformable to time, place, and quality. 7. The three unities of time, place, and action ought to be obſerved; that is, nothing ſhould be repreſented in the ſame picture, but what is tranſacted or paſſes at the ſame time, and may be ſeen at the ſame view.

Secondly, with reſpect to the particular paſſions and affections of the ſubject, the rules are, 1. That the paſſions of brutes be few and ſimple, and have almoſt all an immediate reſpect either to ſelf-preſervation or the propagation of the ſpecies: but in the human kind there is a greater variety, and accordingly more marks and expreſſions thereof. 2. Children not having the uſe of reaſon, act much after the ſame manner as brutes, and expreſs the motions of their paſſions directly, and without fear or diſguiſe. 3. Though the paſſions of the ſoul may be expreſſed by the actions of the body, it is in the face they are generally ſhewn, and particularly in the turn of the eye, and motions of the eye-brows. 4. There are two ways of lifting up the eye-brows, the one at the middle, which likewiſe draws up the corners of the mouth, and argues pleaſant motions; the other at the point next the noſe, which draws up the middle of the mouth, and is the effect of grief or ſadneſs. 5. The paſſions are all reducible to joy and ſadneſs, each of which is either ſimple, or mixed and paſſionate. 6. Joy cauſes a dilatation of the parts: the eye-brows riſe in the middle; the eyes half open, and ſmiling; the pupil ſparkling, and moiſt; the noſtrils a little open; the cheeks full; the corners of the mouth drawn a little upwards; the lips red; the complexion lively; the forehead ſerene. 7. Paſſionate joy, proceeding from love, ſhews the forehead ſmooth and even, the eye-brows a little elevated on the ſide the pupil is turned to, the eyes ſparkling and open, the head inclined towards the object, the air of the face ſmiling, and the complexion ruddy. That proceeding from deſire ſhews itſelf by the body, the arms extending towards the object in uncertain and unquiet motions. 8. Simple ſadneſs is expreſſed by the body being caſt down, the head careleſly hanging aſide, the forehead wrinkled, the eye-brows raiſed to the middle of the forehead, the eyes half-ſhut, and the mouth a little open, the corners downwards, the under lip pointing and drawn back, the noſtrils ſwelled and drawn downwards. That mixed with fear cauſes the parts to contract and palpitate, the members to tremble and fold up, the viſage to be pale and livid, the point of the noſtrils elevated, the pupil in the middle of the eye, the mouth opened at the ſides, and the under lip drawn back. In that mixed with anger, the motions are more violent, the parts all agitated, the muſcles ſwelled, the pupil wild and ſparkling, the point of the eye-brows fixed to the noſe, the noſtrils open, the lips big and preſſed down, the corners of the mouth a little open and foaming, the veins ſwelled, and the hair erect. That with deſpair reſembles the laſt, only more exceſſive and diſordered. 9. The hand has a great ſhare in the expreſſion of the ſentiments and paſſions; the raiſing of the hands, conjoined, towards heaven, expreſſes devotion; wringing the hands, grief; throwing them towards heaven, admiration; fainting and dejected hands, amazement and deſpair; folding hands, idleneſs; holding the fingers indented, muſing; holding forth the hands together, yielding and ſubmiſſion; lifting up the hand and eye to heaven, calling God to witneſs; waving the hand from us, prohibition; extending the right hand to any one, pity, peace, and ſafety; ſcratching the head, thoughtfulneſs; laying the hand on the heart, ſolemn affirmation; holding up the thumb, approbation; laying the fourth finger on the mouth, bidding ſilence; giving with the finger and thumb, a giving ſparingly; and the fore-finger put forth and the reſt contracted to ſhew and point at, as much as to ſay, *this is he*. 10. The ſex of the figure is to be regarded; and man, as he is of a more vigorous and reſolute nature, ought to be expreſſed in all his actions freer and bolder than women, who are to be more reſerved and tender. 11. So alſo as to the age, the different ſtages whereof incline to different motions both of body and mind, 12. The condition or honours a perſon is inveſted with, renders their actions more reſerved, and their motions more grave, contrary to the populace, who obſerve little conduct or reſtraint, giving themſelves up, for the moſt part, to their paſſions; whence their external motions become rude and diſorderly.

Laſtly, in ſpirits, all thoſe corruptible things muſt be retrenched, which ſerved only for the preſervation of life, as veins, arteries, *&c.* only retaining what may ſerve for the form and beauty of the body. In angels particularly, as ſymbolical figures, their offices and virtues are to be marked out, without any draught of ſenſual paſſions, only appropriating their characters to their functions of powers, activity and contemplation.

EXPULSION, in a general ſenſe, the act of violently driving a perſon out of any city, ſociety, *&c.*

EXPULSION, in medicine, the act whereby any thing is forcibly driven out of the place in which it is: thus we ſay, the expulſion of the fœtus in delivery. See the article DELIVERY.

EXPURGATION, in aſtronomy, a term uſed by ſome authors for emerſion. See the article EMERSION.

EXQUIMA, in zoology, a ſpecies of guinea monkey, of a reddiſh brown, ſpotted with white on the upper part of the body, and the under part white, with a beard of a beautiful ſnow-white colour. See the article MONKEY.

EXSICCATION, in chemiſtry, is the act of reducing bodies to a required ſtate of drineſs, by ſeparating the ſuperfluous water or other moiſture with which they were joined.

Exſiccation is moſt generally performed by means of heat; but as the different nature and form of the matter make different degrees and methods of application of the heat neceſſary, three of them have been diſtinguiſhed by the names of coction, inſolation, and torrification. The firſt relates only to fluids; the ſecond to fluids and ſolids promiſcuouſly; the laſt to ſolids only. As to coction or boiling, you are to take care, that, at the cloſe of the operation, the fire be duly ſuppreſſed; otherwiſe the matter being left dry, will be heated beyond the juſt degree, and thence either conſumed or damaged. This precaution is particularly neceſſary in the caſe of vegetable extracts, where the leaſt overheat is apt to make them burn, and acquire an empyreumatic ſcent and flavour. Solutions of ſalts and gums make the principal caſes where coction is uſed in this intention,

Inſolation, or perhaps more properly exhalation, is effected by expoſing the body to the heat of the ſun, till it be ſufficiently dry. In this the ſurface of the matter is to be increaſed as much as poſſible; for in proportion to that will the exſiccation be completed in a greater or leſſer time.

Torrification, or, in the caſe of rhubarb, toaſting, is the expoſing ſolid bodies to the heat of a fire, at ſuch a due diſtance as will not endanger their being burnt, in order to dry them ſo as to be powdered. When roots or woods are thus to be treated, it is proper firſt to cut them into ſlices.

Decantation and filtering are uſed ſubſervient to exſiccation, where large quantities of fluid are to be ſeparated, and after all the exſiccation may be completed by inſolation. This is practiſed in the caſe of precipitations, and where any earths or calx's of metals are to be freed from fluids.

Filtering by attraction is performed by a twiſt of cotton thread made wet, one of which is put into the veſſel containing the matter to be filtered, and the other ſuffered to be hang over the veſſel below the bottom. The thread will act as a ſyphon and draw off the fluid, which will drop from its end till the greateſt part be exhauſted. This method is uſed in the preparation of elaterium: and where the quantity is ſmall, may be found convenient in many others.

The uſe of the chalk-ſtone is another method of exſiccation, chiefly applied to the drying of powders after their levigation. It is done by laying the powder in troches or large drops, on the ſtone, and letting them remain there till they are ſufficiently dry.

E'XTANT, denotes any thing that exiſts, or is ſtill in being.

EXTASY, or ECTASY, a tranſport which ſuſpends the function of the ſenſes, by the intenſe contemplation of ſome extraordinary or ſupernatural object, or when God impreſſes on the imagination the extraordinary ideas of any thing he would reveal.

EXTASY, in medicine, a ſpecies of catalepſy, when a perſon perfectly remembers, after the paroxyſm is over, the ideas he conceived during the time it laſted. In an extaſy there muſt be an unuſual tenſion of the ſenſory, as is common in deliriums, *&c.*

EXTEND, in law, ſignifies to value the lands or tenements of a perſon bound by a ſtatute, *&c.* who has forfeited the ſame, at ſuch an indifferent rate, that by the yearly rent the creditor in time may be paid his debt. See EXTENT.

EXTENDI FACIAS, a writ to extend lands, *&c.* See the preceding article.

EXTENSION, in philoſophy, one of the common and eſſential properties of body or that by which it poſſeſſes or takes up ſome part of univerſal ſpace, which is called the place of that body. See the articles BODY and SPACE.

Extenſion is threefold, 1. Either into length only, and then it is called a line. Or, 2. Into length and breadth, which is called a ſuperficies. Or, 3. Into length, breadth, and depth, which is called a ſolid; being the three dimenſions according to the quantity of which the magnitude or bulk of bodies are eſtimated. See LINE, SUPERFICIES, and SOLID.

Extenſion, according to Mr. Locke, is ſpace conſidered between the extremities of matter, which fills up its capacity with ſomething ſolid, tangible, and moveable. Space, ſays that philoſopher, may be conceived without the idea of extenſion, which belongs to body only.

EXTENSION *of fractured limbs*, in ſurgery, ought to be performed in the following manner: 1. The patient is to be kept firm and ſteady. The poſture of body to be obſerved at this time differs, according to the circumſtances of the caſe; ſometimes the patient ſhould ſit, either upon a ſtool, or upon the floor. 2. An aſſiſtant ſhould ſupport the limb with his hands, both above and below the fractured part. 3. The aſſiſtant, who holds the lower part of the limb, ſhould extend it ſtrongly and equally, till the fractured bone can be replaced: if his hands alone are not ſufficient to make the required extenſion, he muſt uſe a chord, or rather a napkin: if one man has not ſtrength enough for this office, there muſt be two or more employed.

You muſt be careful not to uſe too great roughneſs in this operation, leſt you give your patient unneceſſary pain. If the tumour and inflammation is come on before the extenſion, it is beſt to defer it till theſe ſymptoms are removed. When the fractured bones maintain their natural ſituation, you are under no neceſſity of extending or replacing the limb; but when the fractured parts recede from each other, ſome degree of extenſion is neceſſary, which muſt be always ſuited to the diſtortion of the limb: the greater diſtance there is between the extremities of the divided parts of the bone, ſo much ſhorter will the limb be, from the contraction of the muſcles; therefore the extenſion in this place ought to be ſo much the greater. See the article FRACTURE.

The extenſion in luxated bones is to be performed much in the ſame manner with that in fractures, *viz.* the outer or lower part of the diſlocated limb is to be extended till the head of the diſordered bone be reduced exactly into the ſinus from whence it was luxated.

EXTENSOR, an appellation given to ſeveral muſcles, from theit extending or ſtretching the parts to which they belong: ſuch are, 1. The common extenſor of the fingers, which has its origin at the external condyle of the humerus, and the poſterior part of the radius and ulna: it afterwards divides into four tendons, which paſs under the ligament of the carpus, and terminate in the poſterior ſurface of all the phalanges of the fingers, where they are gibbous. 2. The extenſor of the thumb, called alſo bicornis and tricornis, ariſes in the poſterior and middle part of the radius and ulna, and terminates in two or three tendons in the firſt, ſecond, and third phalanx of the thumb. 3. The proper extenſors of each finger, which are a part of, or at leaſt have their origin with the common extenſor. 4. The long extenſor of the toes, which has its origin in the upper part of the tibia, and in the anterior part of the ligament, between the tibia and fibula: it afterwards divides into five tendons, four of which are inſerted into the four phalanges of the toes, and the fifth into the outer metatarſal bone. 5. The ſhort extenſor of the toes, ariſes from the upper part of the calcaneum, and dividing into tendons, is inſerted into the toes.

Beſides theſe, there are proper extenſors of the toes; alſo the long and ſhort extenſors of the great toe, and the common extenſor of the back and loins, which is divided into three. If theſe act only on one ſide, they draw the parts obliquely ſideways.

EXTENT, in law, is uſed in a double ſenſe; ſometimes it ſignifies a writ or command to the ſheriff for the valuing of lands or tenements; and ſometimes the act of the ſheriff, or other commiſſioner, upon this writ: but moſt commonly it denotes an eſtimate or valuation of lands; and hence come our extended or rack-rents. See the article EXTEND.

Every extent ought to be made on inquiſition and verdict, without which the ſheriff cannot legally execute the writ.

The cognizee, or party to whom the lands are delivered, has no abſolute property in them, but is accountable to the cogniſor according to the extended value only, not the real value. No ſeiſin can be on an extent, nor may lands or goods be ſold thereon.

EXTERIOR, or EXTERNAL. See the article EXTERNAL.

EXTERMINATION, in general, the extirpating or deſtroying ſomething.

In algebra, ſurds, fractions, and unknown quantities are exterminated by the rules for reducing equations. See the article EQUATION.

We have two curious theorems in Mr. Maclaurin's algebra, for exterminating unknown quantities of given equations; and here it is proper to obſerve, that he calls all the coefficients, prefixed to the ſame unknown quantity, coefficients of the ſame order: ſuch are *a*, *d*, *g*, in theorem 2. as being prefixed to the ſame quantity *x*: ſuch alſo are *b*, *e*, *h*; and *c*, *f*, *k*. But he calls thoſe oppoſite coefficients, that are taken each from a different equation, and from a different order of coefficients, as *a* and *e*, and *d* and *b*, in the firſt theorem; and *a*, *e*, *k*; *a*, *b*, *f*; and *d*, *b*, *k*, in the ſecond theorem.

Theorem 1. Suppoſe two equations given involving two unknown quantities, as $\left\{\begin{matrix} ax+by=c \\ dx+ey=f \end{matrix}\right\}$ then ſhall $y=\frac{af-dc}{ae-db}$.

Where the numerator is the difference of the products of the oppoſite coefficients, in the orders in which *y* is not found; and the denominator is the difference of the products of the oppoſite coefficients, taken from the orders that involve the unknown quantities. For from the firſt equation it appears that $ax=c-by$; and $x=\frac{c-by}{a}$; and from the ſecond equation, that $dx=f-ey$, and $x=\frac{f-ey}{d}$.

Therefore, $\frac{c-by}{a}=\frac{f-ey}{d}$; and $cd-dby=af-acy$, whence $aey-dby=af-cd$; and $y=\frac{af-cd}{ae-db}$. Q. E. D.

To exemplify this theorem, ſuppoſe $a=5$, $b=7$, $c=\underline{100}$, $\underline{d=3, e}=8$, and $f=80$. Then $y=\frac{5\times 80-3\times 100}{5\times 8-3\times 7}=\frac{100}{19}=5\frac{5}{19}$; and $x=\frac{240}{19}=12\frac{12}{19}$.

Theorem 2. Suppoſe now that there are three unknown quantities, x, y, z, and three equations: thus,

$$\left\{\begin{array}{l} ax+by+cz=m \\ dx+ey+fz=n \\ gx+hy+kz=p \end{array}\right\} \text{ Then ſhall } z=$$

$$\frac{aep-ahn+dhm-dbp+gbn-gem}{aek-afh+dhc-dbk+gbf-gec}.$$

Where the numerator conſiſts of all the different products that can be made of three oppoſite coefficients, taken from the orders in which z is not found; and the denominator conſiſts of all the products that can be made of the three oppoſite coefficients, taken from the orders that involve the three unknown quantities. For from the laſt it appears, that $y=\frac{an-afz-dm+dcz}{ae-db}$, and $y=\frac{ap-akz-gm+gcz}{ah-gb}$; therefore, $\frac{an-afz-dm+dcz}{ae-db}=\frac{ap-akz-gm+gcz}{ah-gb}$. and $\overline{an-afz}-dm+dcz\times\overline{ah-gb}\times \overline{an-afz}+gbdm-gbdcz=\overline{ap-gm}-akz+gcz\times ae-db\times ap-akz+gbdm-gbdcz$. Take $gbdm-gbdcz$ from both ſides, and divide by a; ſo ſhall $\overline{an-dm-afz+dcz}\times h-gbn+gbfz=\overline{ap-gm-akz+gcz}\times e-dbp+dbkz$.
Then tranſpoſing and dividing will be found

$$z=\frac{aep-ahn+dhm-dbp+gbn-gem}{aek-ahf+dhc-dbk+gbf-gec}.$$

The values of x and y are found after the ſame manner, and have the ſame denominator: *ex. gr.*

$$y=\frac{afp-akn+dkm-dep+gen-gfm}{aek-ahf+dhc-dbk+gbf-gec}.$$

If any term is wanting in any of the three given equations, the values of z and y will be found more ſimple. Thus, ſuppoſe that f and k are equal to nothing, then the term fz will vaniſh in the ſecond equation, and kz in the third; and

$$z=\frac{aep-ahn+dhm-dhp+gbn-gem}{dhc-gec},$$

and $y=\frac{gcn-dep}{dhc-gec}$.

If four equations are given, involving four unknown quantities, their values may be found much in the ſame manner, by taking all the products that can be made of four oppoſite coefficients, and always prefixing contrary ſigns to thoſe that involve the products of two oppoſite coefficients. See the articles COEFFICIENT and EQUATION.

EXTERNAL, or EXTERIOR, a term of relation applied to the ſurface or outſide of a body; or that part which appears or preſents itſelf to the eye, touch, *&c.* in contradiſtinction to internal. See the article INTERNAL.

EXTERNAL MEDICINES, the ſame with local or topical medicines. See the articles TOPICS and LOCAL MEDICINES.

The ſenſes are alſo divided into external, being thoſe whereby we perceive ideas, or have the perception of external objects, as ſeeing, hearing, *&c.* and internal. See the article SENSE.

EXTERNAL is alſo uſed to ſignify any thing that is without-ſide a man, or that is not within himſelf, particularly in his mind, in which ſenſe we may ſay external objects, *&c.*

The exiſtence of an external world, that is, of bodies and objects out of the mind, was abſolutely denied by Dr. Berkeley. See the article EXISTENCE.

EXTERNAL ANGLES, are the angles on the outſide of any right-lined figure, when all the ſides are ſeverally produced, and they are all, taken together, equal to four right angles. See the article ANGLE.

EXTERNAL EAR. See the article EAR.

EXTINCTION, in general, denotes the putting out or deſtroying ſomething, as a fire or flame.

Various engines have been contrived for extinguiſhing accidental fires, for which ſee ENGINE and FIRE.

EXTINCTION, in chemiſtry, is when a metal, mineral, *&c.* after having been heated red hot, is plunged into ſome fluid; either to ſoften and temper its acrimony, as tutty in roſe-water; or to communicate its virtue to the liquor, as iron or ſteel to common water, *&c.*

EXTINGUISHMENT, in law, is a conſolidation or union, as where one has due to him a yearly rent out of lands, and afterwards purchaſes the lands out of which the rent ariſes: in this caſe, both the property and the rent being united in one poſſeſſor, the rent is ſaid to be extinguiſhed. Likewiſe where a perſon has a leaſe for years, and he afterwards buys the property of what is leaſed, the leaſe becomes thereby extinguiſhed.

There is, however, a difference on purchaſing

chaſing part of the lands, and the ſeveral ſorts of rents: thus if a perſon has a rent-charge granted to him and his heirs, iſſuing out of land, and he purchaſes any part of that land to him and his heirs; as this rent is entire, and iſſuing out of every part of the land, the whole rent-charge is extinguiſhed. Yet if ſuch perſon has a rent-ſervice, and he does purchaſe part of the lands where-out it iſſues, this ſhall not extinguiſh all the rent, but only for the land purchaſed.

Extinguishment *of common*, is by purchaſing all the lands which have intereſt therein: alſo if a commoner releaſes his common in one acre, it is an extinguiſhment of the whole; but where he aliens part of his lands, to which the common belongs, the common is not diſtinguiſhed thereby, but ſhall be divided.

Extinguishment *ſervices.* If the lord purchaſes or accepts any part of the tenancy, out of which an entire ſervice is to be paid, the ſervice becomes thereby extinct; unleſs it be for the public good, or homage and fealty, which are not ſubject to entinguiſhment.

Extinguishment *of ways*, is where a perſon has a highway as appendant, and he makes a purchaſe of the land in which the way is, then the way is extinct: tho' it is held, that a way of neceſſity, to a market or church, is not ſo.

EXTIRPATION, the ſame with extermination. See Extermination.

EXTIRPATIONE, in law, a judicial writ that lies againſt a perſon, who, after a verdict found againſt him for land, *&c.* maliciouſly overthrows a houſe, or extirpates any trees upon it.

EXTISPEX, in antiquity, the perſon who drew preſages from viewing the entrails of animals offered in ſacrifice. See Sacrifice, Haruspex, and Divination.

EXTORTION, in law, is an illegal manner of wreſting any thing from a man either by force, menace, or authority. It is alſo the exaction of unlawful uſury, winning by unlawful games, and taking more than is due under pretence of right, as exceſſive tolls in millers, *&c.*

At the common law, extortion is puniſhable by fine and impriſonment; and the ſtatute of 3 Eliz. 1. c. 30. has enacted, that officers of juſtice guilty of extortion for the expedition of buſineſs, *&c.* ſhall render to the party treble value. There are likewiſe divers other ſtatutes for puniſhing extortions of ſheriffs, bailiffs, gaolers, clerks of the aſſiſe and of the peace, attornies, ſolicitors, *&c.*

EXTRA, a latin prepoſition ſignifying *without*, and uſed in compoſition with other words, as for inſtance, 1. Extrajudicial, where judgment is given in a cauſe that is not depending in the court where the ſame paſſed; or whereon the judgment has no juriſdiction. 2. Extraparochial, which is ſaid of places out of the bounds of any pariſh, or freed from the duties of a pariſh. The greateſt part of the foreſts in England are extra-parochial.

EXTRACT, in pharmacy, is a ſolution of the purer parts of a mixed body inſpiſſated, by diſtillation or evaporation, nearly to the conſiſtence of honey. Extracts may be made almoſt of every part of the materia medica, or from any medicine, whether ſimple or compound, that is ſuited to give a tincture to any menſtruum, in which it is cuſtomarily infuſed. They make a principal part of modern pharmacy, and with great reaſon too; for the different elements of many compound bodies have quantities and powers, when ſeparate and pure, which they are incapable of exerting when their force is ſuppreſt by the quantity, or counteracted by the repugnant qualities of other ſpecies wherewith they are conjoined, as in the inſtances of acid ſpirits, teſtaceous earths, calces of metals, gums or reſins of vegetables, and many others. The directions given by the college of phyſicians for making extracts, are theſe. Take the matter from which the extract is to be prepared, cut, bruiſe, or otherwiſe manage it, as its nature requires, for infuſion. Pour upon it ſpirit of wine, or any diſtilled waters, moſt accommodated to the preſcriber's intention. Let it continue in infuſion in a bath, or any other ſlow heat, for two days, or more according as the hardneſs or ſoftneſs of the matter requires, until the liquor is impregnated with the tincture of the thing infuſed. Then let the tinged liquor be ſeparated by inclination, pouring on a freſh menſtruum, infuſing and ſeparating, as before, as long as any tincture can be obtained. Let all the tinctures be put together and filtered through cap-paper, and then in a bath-heat evaporate the humidity, until the matter left is of the conſiſtence of honey, which muſt be kept for uſe. And to this extract, for the ſake of preſerving it moiſt, muſt be added ſome portion of ſalt, or ſome other thing ſuitable to the main intention.

The moſt remarkable extracts of the London Diſpenſatory are, 1. Extracts of the roots of elecampane, gentian, black hellebore, of the leaves of rue and ſavine, 2. Extract of liquorice. 3. Of logwood. 4. Of peruvian bark, both ſoft and hard. 5. Of lignum vitæ, both ſoft and hard. 6. Of jalap. And, 7. The cathartic extract which is prepared from proof ſpirit poured upon a proper quantity of ſuccotrine aloes, the pith of coloquintida, ſcammony, and the leſſer cardamom-ſeeds huſked. The thebaic extract conſiſts only of opium diſſolved in water, ſtrained and evaporated to a conſiſtence. Let it be remarked, that all watery extracts ſhould be moiſtened or ſprinkled with a little ſpirit of wine, to prevent their growing mouldy.

EXTRACT, in matters of literature, is ſomething copied or collected from a book or paper.

EXTRACTS of writings or records, are notes upon them. See ESTREAT.

EXTRACTA CURIÆ, are the iſſues or profits of holding a court ariſing from the cuſtomary dues, fees and amercements.

EXTRACTION, in chemiſtry and pharmacy, the operation by which eſſences, tinctures, &c. are drawn from natural bodies. See the article EXTRACT.

EXTRACTION, in ſurgery, is the drawing any foreign matter out of the body by the hand, or by the help of inſtruments. In extracting arrows and ſuch like bearded weapons uſed by barbarous nations, the whole buſineſs conſiſts in drawing out the head, ſo as that its protuberant beards or hooks may not wound and lacerate the contiguous parts. If it appears to be lodged but ſuperficially under the integuments, it will be beſt to draw it out the ſame way it entered, provided the wound be firſt ſufficiently dilated by inciſion, in order to prevent the laceration of the adjacent parts: otherwiſe it muſt be thruſt forwards, and drawn out in the direction of its point in the oppoſite ſide, if poſſible, an inciſion being firſt made to meet it. This laſt method is moſt eligible, when the weapon has deſcended very deep; ſo that there is much leſs ſpace for it to paſs onward, than to be drawn back again; and alſo when it has paſſed beyond any large bloody-veſſels or nerves, ſo that it would induce a laceration of them to draw it back.

In extracting foreign bodies from the ear, you muſt firſt be informed by the account of the patient, and by ſearching with a probe, of what nature the offending body is; and if it happen to be a lump of dried indurated wax, it will be proper to inject ſome warm milk, or oil of olives or almonds, ordering the patient to hold his head inclined on the contrary ſide while you uſe the ſyringe. If a ſmall calculus, &c. be lodged in it, you muſt firſt of all relax and mollify the paſſages of the ear, and then carefully extract the body with a probe or pliers. But if the foreign body ſhould happen to be a peat bean, or other grain, which is too much ſwelled by the humours to be diſcharged intire by the probe, or other inſtrument, you muſt break it with pliers, or cut it with ſmall ſciſſars, and extract it bit by bit. Sometimes an inſect gets into the ear, and by ſtruggling to get looſe from the glutinous ear-wax, excites an intolerable pruritus and tickling, which in time turns to acute pain. When the inſect can be perceived, it may be drawn out by a probe, &c. but if that fails, you muſt inject warm oil, of ſpirit of wine, which will quickly kill the inſect, and then you may waſh it out with the ſame or ſome other liquor, and afterwards cleanſe the cavity of the ear with a bit of cotton or lint upon the end of your probe.

To extract bodies fallen into the eyes, the firſt and moſt eaſy method is by agitating and extending the eye-lids with one's fingers, holding the head down at the ſame time, by which means the increaſed flux of tears excited by the vellicating body, very often waſhes it out of the eye without much difficulty. But if this method does not ſucceed, the next remedy is to blow ſome levigated pearl or crab claws through a quill under the eye-lid, that as theſe are waſhed out by tears, they may alſo take the foreign body with them, otherwiſe the ſurgeon muſt take the ſmall round head of a ſlender probe, or the end of a tooth-pick, and extending the eye-lids gently from the eye, carefully extract the offending body. Lime or any acrid ſalt may be waſhed from the eyes by a pencil bruſh of ſoft feathers, or a bit of fine ſponge ſoftened in a quill, dipped in warm water.

The method of extracting ſmall bones of fiſh, needles, pins, &c. ſticking in the fauces or gula, is as follows. When the offending body cannot be removed by taking a large draught of ſome liquor, or ſwallowing a large mouthful of bread, &c. recourſe muſt be had to ſome inſtrument. The tongue is firſt to be depreſſed with a ſpatula, in order to obſerve whether the obſtacle can be ſeen; and if it appears near the upper part of the oeſophagus,

phagus, it ſhould be cautiouſly extracted with a pair of pliers, or ſome ſuch inſtrument. But if it is lodged deep in the oeſophagus, the ſurgeon may then give the patient a piece of ſponge to ſwallow, that has firſt been dipt in oil, and well faſtened to a ſtrong cord, by which it is to be pulled up again, after it has been ſwallowed by the patient as far as it will go; by which means the body ſticking in the oeſophagus, will be either forced down into the ſtomach, or elſe drawn up into the mouth.

For the extraction of bullets, &c. from wounds. See GUN-SHOT WOUNDS.

EXTRACTION, in genealogy, implies the ſtock or family from which a perſon is deſcended.

EXTRACTION *of roots*, in algebra and arithmetic, the method of finding the root of any power or number. See the articles, ROOT, SQUARE, CUBE, &c.

The reader will perceive by the articles involution and power, that the extraction of roots, or the reſolving of powers into their roots, is the reverſe of involution, and conſequently that the roots of ſingle quantities are eaſily extracted by dividing their exponents by the number that denominates the root required; for the powers of any root are found by multiplying its exponent by the index that denominates the power; and therefore, when any power is given, the root muſt be found by dividing the exponent of the given power by the number that denominates the kind of root that is required. Thus the ſquare root of a^8 is $a^{\frac{8}{2}}=a^4$; and the ſquare root of $a^4b^8c^2$, is a^2b^4c. The cube root of a^6b^3, is $a^{\frac{6}{3}}b^{\frac{3}{3}}=a^2b$; and the cube root of $x^9y^6z^{12}$, is $x^3y^2z^4$. It will alſo appear from what we ſhall ſay of involution, that any power that has a poſitive ſign, may have either a poſitive or negative root, if the root is denominated by an even number. Thus the ſquare root of $+a^2$ may be $+a$ or $-a$, becauſe $+a\times+a$ or $-a\times-a$ gives $+a^2$ for the product. But if a power have a negative ſign, no root of it denominated by an even number can be aſſigned, ſince there is no quantity that multiplied into itſelf an even number of times can give a negative product. Thus the ſquare root of $-a^2$ cannot be aſſigned, and is what we call an impoſſible or imaginary quantity. See the article ROOT.

But if the root to be extracted is denominated by an odd number, then ſhall the ſign of the root be the ſame as the ſign of the given number whoſe root is required. Thus the cube root of $-a^3$ is $-a$, and the cube root of $-a^6b^3$, is $-a^2b$. If the number that denominates the root required is a diviſor of the exponent of the given power, then ſhall the root be only a lower power of the ſame quantity. As the cube root of a^{12} is a^4, the number 3 that denominates the cube root being a diviſor of 12. But if the number that denominates what ſort of root is required is not a diviſor of the exponent of the given power, then the root required ſhall have a fraction for its exponent: thus the ſquare root of a^3 is $a^{\frac{3}{2}}$, the cube root of a^5 is $a^{\frac{5}{3}}$, and the ſquare root of a itſelf is $a^{\frac{1}{2}}$. Theſe powers that have fractional exponents, are called imperfect powers or ſurds, and are multiplied and divided, involved and evolved, after the ſame manner as perfect powers. Thus the ſquare of $a^{\frac{3}{2}}$ is $a^{2\times\frac{3}{2}}=a^3$; and the cube of $a^{\frac{2}{5}}$ is $a^{3\times\frac{2}{5}}=a^{\frac{6}{5}}$. The ſquare root of $a^{\frac{2}{3}}$ is $a^{\frac{2}{3\times 2}}=a^{\frac{1}{3}}$; and the cube root of $a^{\frac{3}{4}}$ is $a^{\frac{1}{4}}$. See the article SURD.

The ſquare root of any compound quantity, as $a^2+2ab+b^2$, is diſcovered after this manner. Firſt take care to diſpoſe the terms according to the dimenſions of the alphabet, as in diviſion; then find the ſquare root of the firſt term aa, which gives a for the firſt member of the root. Then ſubtract the ſquare from the propoſed quantity, and divide the firſt term of the remainder $2ab+b^2$, by the double of that member, *viz.* $2a$, and the quotient b is the ſecond member of the root. Add this ſecond member to the double of the firſt, and multiply their ſum $2a+b$ by the ſecond member b, and ſubtract the product $2ab+b^2$ from the foreſaid remainder $2ab+b^2$, and if nothing remains, then the ſquare root is obtained. The manner of the operation is thus:

$$\begin{array}{ll} & a^2+2ab+b^2\ (a+b \\ & a^2 \\ \hline 2a+b & 2ab+b^2 \\ \times b) & 2ab+b^2 \\ \hline & 0. \quad 0. \end{array}$$

But if there had been a remainder, you muſt have divided it by the double of the ſum of the two parts already found, and the quotient would have given the third member of the root. Thus if the quantity propoſed had been $a^2+2ab+2ac$

$+b$

$+ b^2 + 2bc + c^2$, after proceeding as above you would have found the remainder $2ac + 2bc + c^2$, which divided by $2a + 2b$, gives c to be annexed to $a + b$, as the third member of the root. Then adding c to $2a + 2b$, and multiplying their ſum $2a + 2b + c$ by c, ſubtract the product $2ac + 2bc + c^2$ from the foreſaid remainder; and ſince nothing now remains, you conclude that $a + b + c$ is the ſquare root required.

The operation is thus:

$$
\begin{array}{r l}
 & a^2 + 2ab + 2ac + b^2 + 2bc + c^2 \left(a + b + c \right. \\
 & a^2 \\
\hline
2a + b) & 2ab + 2ac + b^2 + 2bc + c^2 \\
\times b) & 2ab \qquad + b^2 \\
\hline
2a + 2b + c) & 2ac + 2bc + c^2 \\
\times c) & 2ac + 2bc + c^2 \\
\hline
 & 0. \quad 0. \quad 0.
\end{array}
$$

Another example. Required the ſquare root of $xx - ax + \frac{1}{4}aa$

$$
\begin{array}{r l}
 & xx - ax + \frac{1}{4}aa \left(x - \frac{1}{2}a \right. \\
 & xx \\
\hline
2x - \frac{1}{2}a) & -ax + \frac{1}{4}aa \\
\times - \frac{1}{2}a) & -ax + \frac{1}{4}aa \\
\hline
 & 0. \quad 0.
\end{array}
$$

The ſquare root of any number is found out after the ſame manner. If it is a number under 100, its neareſt ſquare root is found by the following table, by which alſo its cube root is found, if it be under 1000, and its biquadratic, if it be under 10000.

Root	1	2	3	4	5	6	7	8	9
Square	1	4	9	16	25	36	49	64	81
Cube	1	8	27	64	125	216	343	512	729
Biquad.	1	16	81	256	625	1296	2401	4096	6561

But if it is a number above 100, then its ſquare root will conſiſt of two or more figures, which will be found by different operations by the following rule. Place a point above the number that is in the place of units; paſs the place of tens, and place again a point over that of hundreds; and go on towards the left hand, placing a point over every ſecond figure, and by theſe points the number will be diſtinguiſhed into as many parts as there are figures in the root. Then find the ſquare root of the firſt part, and it will give the firſt figure of the root, ſubtract its ſquare from that part, and annex the ſecond part of the given number to the remainder. Then divide this new number (neglecting its laſt figure) by the double of the firſt figure of the root; annex the quotient to that double, and multiply the number thence ariſing by the ſaid quotient; and if the product is leſs than your dividend, or equal to it, that quotient ſhall be the ſecond figure of the root. But if the product is greater than the dividend, you muſt take a leſs number for the ſecond figure of the root than that number. Much after the ſame manner may the other figures of the quotient be found, if there are more points than two placed over the given number.

To find the ſquare root of 99856, I firſt point it thus, $\dot{9}9\dot{8}5\dot{6}$, then I find the ſquare root of 9 to be 3, which therefore is the firſt figure of the root. I ſubtract 9 the ſquare of 3 from 9, and to the remainder I annex the ſecond part 98, and I divide (neglecting the laſt figure 8) by the double of 3 or 6, and I place the quotient after 6, and then multiply 61 by 1, and ſubtract the product 61 from 98. Then to the remainder 37, I annex the laſt part of the propoſed number (56) and by dividing 3756 (neglecting the laſt figure 6) by the double of 31, that is by 62, I place the quotient after, and multiplying 626 by the quotient 6, I find the product to be 3756, which ſubtracted from the dividend, and leaving no remainder, the exact root muſt be 316.

Examples.

$$
\begin{array}{r l}
 & \dot{9}9\dot{8}5\dot{6} \left(316 \right. \\
 & 9 \\
\hline
61) & 98 \\
\times 1) & 61 \\
\hline
626) & 3756 \\
\times 6) & 3756 \\
\hline
 & 0
\end{array}
$$

$$
\begin{array}{r l}
 & \dot{2}7\dot{3}9\dot{4}7\dot{5}6 \left(5234 \right. \\
 & 25 \\
\hline
102) & 239 \\
\times 2) & 204 \\
\hline
1043) & 3547 \\
\times 3) & 3129 \\
\hline
10464) & 41856 \\
\times 4) & 41856 \\
\hline
 & 0
\end{array}
$$

$$
\begin{array}{r l}
 & \dot{5}2\dot{9} \left(23 \right. \\
 & 4 \\
\hline
43) & 129 \\
\times 3) & 129 \\
\hline
 & 0
\end{array}
$$

In general, to extract any root out of any given quantity: firſt range that quantity according to the dimenſions of its letters, and extract the ſaid root out of the firſt term, and that ſhall be the firſt member of the root required. Then raiſe this root to a dimenſion lower by unit than the number that denominates the root required, and multiply the power that ariſes by that number itſelf; divide the ſecond term of the given quantity by the product, and the quotient ſhall give the ſecond member of the root required. Thus to extract the root of the fifth power out of $a^5 + 5a^4b + 10a^3b^2 + 10a^2b^3 + 5ab^4 + b^5$, I find that the root of the fifth power out of a^5, gives a; which I raiſe to the fourth power, and multiplying by 5, the product is $5a^4$; then dividing the ſecond term of the given quantity $5a4b$ by $5a^4$, I find b to be the ſecond member; and raiſing $a + b$ to the fifth power and ſubtracting it, there being no remainder, I conclude that $a + b$ is the root required. If the root has three members, the third is found after the ſame manner from the firſt two conſidered as one member, as the ſecond member was found from the firſt, which may eaſily be underſtood from what was ſaid of extracting the ſquare root.

In extracting roots, it will often happen that the exact root cannot be found in finite terms. Thus the ſquare root of $a^2 + x^2$ is found to be $a + \frac{x^2}{2a} - \frac{x^4}{8a^3} + \frac{x^6}{16a^5} - \frac{5x^8}{128a^7} +$ &c. &c.

The operation is thus:

$$\begin{array}{l}
a^2+x^2\Big(\, a+\frac{x^2}{2a}-\frac{x^4}{8a^3}+\frac{x^6}{16a^5}-\text{\&c.} \\
a^2 \\
2a+\frac{x^2}{2a}\Big)\;*\;+x^2 \\
\qquad\times\frac{x^2}{2a}\Big)=x^2+\frac{x^4}{4a^2} \\
\hline
2a+\frac{x^2}{a}-\frac{x^4}{8a^3}\Big)-\frac{x^4}{4a^2} \\
\qquad\quad\times-\frac{x^4}{8a^3}\Big)=-\frac{x^4}{4a^2}-\frac{x^6}{8a^4}+\frac{x^8}{64a^6} \\
\hline
\qquad\qquad\qquad\qquad\qquad+\frac{x^6}{8a^4}-\frac{x^8}{64a^6},\ \text{\&c. \&c.}
\end{array}$$

After the ſame manner, the cube root of $a^3 + x^3$ will be found to be $a + \frac{x^3}{3a^2} - \frac{x^6}{9a^5} + \frac{5x^9}{81a^8} - \frac{10x^{12}}{243a^{11}} +$ &c.

The reader will find a general theorem for extracting the root of any binomial under the article BINOMIAL.

The roots of numbers are to be extracted as thoſe of algebraic quantities. Place a point over the units, and then place points over every third, fourth, or fifth figure towards the left hand, according as it is the root of the cube, of the fourth or fifth power that is required; and if there be any decimals annexed to the number, point them after the ſame manner, proceeding from the place of units towards the right hand. By this means the number will be divided into ſo many periods, as there are figures in the root required. Then enquire which is the greateſt cube, biquadrate, or fifth power in the firſt period, and the root of that power will give the firſt figure of the root required. Subtract the greateſt cube, biquadrate, or fifth power from the firſt period, and to the remainder annex the firſt figure of your ſecond period, which ſhall give your dividend. Raiſe the firſt figure already found to a power leſs by unit than the power whoſe root is ſought, that is, to the ſecond, third, or fourth power, according as it is the cube root, the root of the fourth, or the root of the fifth power that is required, and multiply that power by the index of the cube, fourth or fifth power, and divide the dividend by this product, and the quotient will be the ſecond figure of the root required.

Raiſe the part already found of the root, to the power whoſe root is required, and if that power be found leſs than the two firſt periods of the given number, the ſecond figure of the root is right; but if it be found greater, you muſt diminiſh the ſecond figure of the root, till that power be found equal to or leſs than thoſe periods of the given number. Subtract it, and to the remainder annex the next period, and proceed till you have gone through the whole given number; finding the third figure by means of the two firſt, as you found the ſecond by the firſt, and afterwards finding the fourth figure (if there be a fourth period) after the ſame manner from the three firſt.

Thus to find the cube root of 13824, point it $1\dot{3}82\dot{4}$: find the greateſt cube in 13, *viz.* 8, whoſe cube root 2 is the firſt figure of the root required. Subtract 8 from 13, and to the remainder 5 annex 8, the firſt figure of the ſecond period; divide 58 by triple the ſquare of 2, *viz.* 12, and the quotient is 4, which is the ſecond figure of the root required, ſince the cube of 24 gives 13824, the number propoſed.

Operation.

$1\dot{3}82\dot{4}(24$
$8=2\times2\times2$
$3\times4=12)\ 58(4$
Subtract $24\times24\times24=13824$
Rem. 0

After the ſame manner the cube root of 13312053, is found to be 237.

Operation.

$1\dot{3}31\dot{2}05\dot{3}(237$
$8=2\times2\times2$
$12)53(4$ or 3
Subtract the cube of $23=12167$
$3\times23\times23=1587)11450(7$
Subtract the cube of $237=13312053$
0

In extracting of roots, after you have gone through the number propoſed, if there is a remainder, you may continue the operation by adding periods of cyphers to that remainder, and find the true root in decimals to any degree of exactneſs required.

For the method of extracting the root of any affected equation. See the article *Quadratic* EQUATION, *&c.*

EXTRACTOR, in midwifery, an inſtrument, or forceps, for extracting children by the head. See DELIVERY.

EXTRAORDINARII, in roman antiquity, a body of forces conſiſting of a third part of the horſe and a fifth part of the foot, which was ſeparated from the reſt, with great policy and caution, to prevent any deſign that they might poſſibly entertain againſt the natural forces. A ſelect body of ſoldiers, choſen from among the extraordinarii, were thoſe called ablecti. See the article ABLECTI.

EXTRAVAGANTES, thoſe decretal epiſtles, which were publiſhed after the clementines.

They were ſo called becauſe, at firſt, they were not digeſted, or ranged, with the other papal conſtitutions, but ſeemed to be, as it were, detached from the canon law. They continued to be called by the ſame name when they were afterwards inſerted in the body of the canon law. The firſt extravagantes are thoſe of John XXII. ſucceſſor of Clement V. the laſt collection was brought down to the year 1483, and was called the common extravagantes, notwithſtanding that they were likewiſe incorporated with the reſt of the canon law. See the article DECRETAL.

EXTRAVASATION, in contuſions, fiſſures, depreſſions, fractures, and other accidents of the cranium, is when one or more of the blood-veſſels that are diſtributed on the dura mater, is broke or divided, whereby there is ſuch a diſcharge of blood as greatly oppreſſes the brain, and diſturbs its offices; frequently bringing on violent pains, and other miſchiefs; and at length, death itſelf, unleſs the patient is timely relieved. See the articles CONTUSION, FISSURE, and FRACTURE.

If the extravaſated quantity of blood be ever ſo ſmall, it will certainly corrupt, and affect the meninges, and the brain itſelf, with the ſame diſorder: from hence will proceed violent inflammations, deliriums, ulcers, *&c.* and even death itſelf, ſooner or later. And this will frequently be the caſe, after a violent blow upon the cranium, though the bone ſhould eſcape without any injury. In this caſe the blood is ſpilt either between the cranium, and dura mater, or between the dura mater and pia mater, or between the pia mater and the brain, or laſtly, between the ſinuſes of the brain. Each of theſe caſes are attended with great danger, but the deeper the extravaſation happens, ſo much greater will the danger be. See the article WOUND.

You may ſuſpect that blood is extravaſated in the cavity of the cranium, from the violence of the ſymptoms which ſucceed, if the patient lies ſtill without ſenſe or motion, if blood flows from the mouth or noſe, if the eyes are much inflamed and ſwelled, if vomiting ſucceeds; and when upon the remiſſion of theſe ſymptoms the patient complains of a remarkable heavineſs of the head, a ſleepineſs, vertigo, blindneſs, ſpaſms, *&c.* When the quantity of extravaſated blood is very conſiderable the patient dies on the ſpot.

If no fiſſure or contrafiſſure in the cranium, nor any external injury appear on the head after a violent blow, then, in order to find out in what part of the head the extravaſation is ſeated, it will be proper to ſhave the head all over, and if no mark of a ſtagnation of blood appears, cover the head with an emollient plaſter, laying over it medicated bags well heated, which will, in a few hours, produce tumour, and ſoftneſs upon the injured part. See the article CONTRA-FISSURE.

When the ſeat of the injury is diſcovered, the firſt intention is to diſcharge the extravaſated blood, for which intent many adviſe the uſe of the trepan: but as that ſhould not be attempted, unleſs in a caſe of abſolute neceſſity, 'tis beſt to try firſt the uſe of attenuating and dividing medicines. See the articles TREPAN and ATTENUANTS.

With this intention, open a vein, and draw away as much blood as the ſtrength of the patient will admit; preſcribe a briſk purge, or ſharp clyſters; foment the head with medicated bags, and apply a melilot plaſter to it; give frequently attenuating warm fluids: the operation of bleeding muſt be repeated, eſpecially if the patient is young and athletic.

EXTRAVASATION of *blood betwixt the fleſh and the ſkin*, in phlebotomy, the ſame with ecchymoſis. See ECCHYMOSIS.

EXTREMES, in logic, the terms expreſſing the two ideas whoſe relation we enquire after in a ſyllogiſm. See the article SYLLOGISM.

EXTREME *and mean proportion*, in geometry, is when a line A B, (plate XCIV. fig. 2.) is ſo divided in F, that the rectangle under the whole line AB, and the leſſer ſegment F B, is equal to the ſquare of the greater ſegment A F.

Let a ſquare be formed upon the line A B, and one of its ſides A C be equally divided in the point D; draw D B, and take the line D G equal to the line B D, then the ſquare A G H F will be equal to the rectangle F E.

For ſince the line A C is equally divided in the point D, and is lengthened by the line AG, the rectangle C H, together with the ſquare of the line A D, will (by 6. 2. of each) be equal to the ſquare of the line D G or D B. But the ſquare A E, with the ſquare of the line A D, is alſo equal (47. 1.) to the ſquare of the line D B. Therefore the ſquare A E is equal to the rectangle C H. Taking then away from both the rectangle C F, the rectangle F E will be equal to the ſquare F G.

But no number can be ſo divided into two parts, as is well demonſtrated by Clavius, in his commentaries upon lib. 9. of Euclid; which is evident enough thus: Let a be the number, and x the greater part; then the leſſer part will be $a-x$, and ſo $aa-ax=xx$, and thence $x=\frac{a+a\sqrt{5}}{2}$.

ſquare root of 5 cannot be had in numbers exactly, it is plain that the value of x partly conſiſting of the ſquare root, multiplied by a, cannot be had exactly in numbers neither.

EXTREME UNCTION. See UNCTION.

EXTREMUM *clauſit diem*, in law. See the article DIEM.

EXTRINSIC, among metaphyſicians, is taken in various ſenſes: ſometimes it ſignifies a thing's not belonging to the eſſence of another; in which ſenſe, the efficient cauſe and end of a thing are ſaid to be extrinſic. Sometimes it ſignifies a thing's not being contained within the capacity of another; in which ſenſe theſe cauſes are called extrinſic, which introduce ſomething into a ſubject from without, as when a fire introduces heat. Sometimes it ſignifies a thing added or applied to another, in which ſenſe accidents and adherents are ſaid to be extrinſic to the ſubjects to which they adhere. Sometimes the viſion is ſaid to be extrinſic from ſome form which does not exiſt in that thing, but is adjacent to it, or by ſome means or other without it. See the article INTRINSIC.

EXULCERATION, in ſurgery. See the article ULCER.

EXUVIÆ, among naturaliſts, denote the caſt off parts, or coverings, of animals, as the ſkins of ſerpents, caterpillars, and other inſects. See the articles SERPENT and CATERPILLAR.

Mr. Reaumur is very particular in deſcribing the manner in which the caterpillar tribe throw off, or extricate themſelves from, their exuviæ. See vol. i. of his Hiſtory of Inſects.

The crab, as is well known, can even throw off its limbs at pleaſure, which are again replaced by new ones. See the article CANCER.

EXUVIÆ is alſo uſed for the remains of ſea-animals, found foſſile, and more properly called extraneous, or marine foſſils. See the article FOSSIL.

EYE, *oculus*, in anatomy, the organ of ſight; or that part of the body, whereby viſible objects are repreſented to the mind.

With regard to the eyes, we are to obſerve firſt, their ſituation, which is in the upper part of the face, to the end that we may be able to ſee at a greater diſtance than otherwiſe we could. Secondly, their figure, which, excepting for the internal parts, is globular; and thirdly, their colour, which in the human ſpecies is variable; ſome being black, others greyiſh, and others bluiſh.

The parts which do not enter into the compoſition of the eye, but are deſtined for the aſſiſtance of ſeeing, are the eye-brows, the eye-lids, and the muſcles of the eyes.

The eye-lids, palpebræ, are the integuments of the eyes: there are two of them to each, an upper, and an under-lid; and, at their joining, there are formed two corners, called canthi, an interior and larger, and an exterior and ſmaller; they are capable of cloſing and opening at pleaſure, by means of muſcles. They are compoſed of the epidermis, the cutis, which is there very thin, and an arched cartilage, called the tarſus of the eye-lid; and are lined on the inner ſurface with a fine and delicate ſoft membrane, very ſenſible and continuous to the perioſteum, and to the albuginea of the eye.

The eye-laſhes, cilia, are certain rigid hairs, ſituated on the arch or tarſus of the eye-lids, and bent in a very ſingular manner; they are deſtined for keeping external bodies out of the eye, and for moderating the influx of light.

The glaudulæ ſebaceæ are ſituated in the interior ſurface of the eye-lids: they ſerve for the ſecretion of an oleaginous fluid, which is of great uſe in preventing the attrition of the eye-lids, from their continual motion.

After this we obſerve the caruncula lachrymalis. See the article CARUNCULA.

The glandula lachrymalis is ſituated in the orbit, above the ſmaller angle, with its excretory ducts under the upper eye-lid, and the puncta lachrymalia are two. See the article LACHRYMAL.

The uſe of the eye-lids is to cover and defend the eyes; to wipe off foulneſs from the cornea; to moderate the influx of light, at pleaſure; and, by their frequent motion, to occaſion a ſecretion of a neceſſary fluid from the glands.

The muſcles of the eyes, ſerving to their motions, are in the human frame ſix in number: four ſtraight, *viz.* the attollens, deprimens, adductor, and abductor; and two oblique, the ſuperior and inferior. See the articles MUSCLE, ATTOLLENS, *&c.*

Between, and among theſe, there is a conſiderable quantity of fat ſerving for various very important purpoſes.

The proper parts of the eye, which form its globe, or bulb, are its coats, or tunics, the humours and the veſſels.

The coats of the eye are ſeveral. 1. The albuginea, adnata, or conjunctiva. 2. The cornea. 3. The ſclerotic, in which what is called the aquæducts of Nuck are to be obſerved. 4. The choroides. 5. The uvea, wherein we are to obſerve, 1. Its anterior coloured ſurface, called the iris, which is intirely vaſcular, and from which ariſes the variety of colours in the human eyes. 2. The pupil or foramen, which is round in the human eye, is nearly in the middle of the iris, and is capable of dilatation and contraction. 3. Its poſterior ſurface, which is black, and in which, when this blackneſs is cleared away, there appears the ſphincter of the pupil, formed of circular fibres for contraction; the ciliary fibres, or proceſſes for the dilatation of the pupil; the ciliary ligament for the motion of the vitreous and cryſtalline humours; the arterial and venal circles, from which the veſſels are in a wonderful manner diſtributed over the uvea; the choroides; the ligamentum ciliare; and the vitreous and cryſtalline humours; the ductus nigri, ſo called from their black colour, placed between the proceſſes and the ligamentum ciliare; the ſpace between the uvea and the cornea, called the anterior camera of the eye; and that between the uvea and the cryſtalline, called its poſterior camera, which is either much ſmaller or intirely wanting. Many authors have attributed glands to the uvea, but they are very difficult to be diſtinguiſhed, if there be any. See the articles ALBUGINEA, CORNEA, SCLEROTICA, *&c.*

Finally, we are to mention the retina, which is a very delicate tender, and as it were, mucous coat of the eye; or, more properly, it is only an expanſion of the optic nerve at the bottom of the eye: it is a primary part of the eye, and the great organ of viſion, for the ſake of which all the reſt were formed. See the article RETINA.

The humours of the eye are generally eſtabliſhed to be three; their office is to ſerve for the expanſion of the coats, and for the refraction of the rays of light, they are diſtinguiſhed by the names of aqueous, vitreous, and cryſtalline. See the articles AQUEOUS, VITREOUS, and CRYSTALLINE.

After theſe three humours of the eye, we obſerve the tunica arachnoides: this as an extremely thin and fine viſculous membrane, which ſurrounds the cryſtalline and the vitreous humour, and by the aſſiſtance of which the cryſtalline lens is lodged in the fovea of the vitreous humour. On the cutting or breaking of this membrane, the cryſtalline falls out.

The blood-veſſels are next to be conſidered: theſe are diſtributed in an amazing manner through the internal parts of the eye. Arteries from the internal and external carotids go to the eye in many different parts. There are alſo numbers of extremely minute ones, which convey only a fine and ſubtile lymph thither, by which means the tunics and humours of the eye are nouriſhed; the veins partly carry the blood back to the ſinuſes of the dura mater, and partly to the jugulars.

Beſides theſe veſſels, Valſalva aſſures us, that he diſcovered a number of true and proper lymphatics in the eye of an ox.

The nerves of the eye are very numerous: beſides the optic nerve, which, by its expanſion forms the retina, and enters the eye from the ſide of the noſe, there are the third and fourth pair of the brain, and a fifth and ſixth branch diſtributed about the muſcles, membranes, eye-lids, and lachrymal ſacculus and gland. See the article NERVE.

Motions of the EYE are either external or internal. The external motion is that performed by its four ſtraight and two oblique muſcles, whereby the whole globe of the eye changes its ſituation or direction. The ſpherical figure of our eyes, and their looſe connection to the edge of the orbit, by the tunica conjunctiva, which is ſoft, flexible and yielding, does excellently diſpoſe them to be moved this, or the other way, according to the ſituation of the object we would view. By the membranes already deſcribed, the eye is connected to the edge of the orbit, which being ſoft and flexible, they do in ſuch a manner, as not in the leaſt to impede its neceſſary motions; and that great quantity of fat placed all round the globe, betwixt it and the orbit, lubricates and ſoftens the eye, and renders its motions more eaſy: hence ariſe the three following remarkable obſervations. 1. When nature has denied the head any motion, it is obſervable, that ſhe has, with great care and induſtry, provided for this defect. To this purpoſe belongs the ſurprizing beautiful and curious mechaniſm obſervable in the immoveable eyes of flies, waſps, *&c.* They nearly reſemble two protuberant hemiſpheres, each conſiſting of a prodigious number of other little ſegments of a ſphere, all which ſegments are perforated by a hole, which may be called their pupil, in which this is remarkable, that every foramen, or pupil, is of a lenticular nature, ſo that we ſee objects through them topſy-turvy, as through ſo many convex glaſſes: yea, they become a ſmall teleſcope, when there is a due focal diſtance between them and the lens of the microſcope by which they are viewed. Leuwenhoek's obſervations make it probable, that every lens of the cornea ſupplies the place of the cryſtalline humour, which ſeems to be wanting in thoſe creatures, and that each has a diſtinct branch of the optic nerve anſwering to it, upon which the images are painted, ſo that as moſt animals are binocular, and ſpiders for the moſt part octonocular, ſo flies, *&c.* are multocular, having in effect as many eyes as there are perforations in the cornea, by which means, as other creatures but with two eyes are obliged, by the contraction of the muſcles above enumerated, to turn their eyes to objects, theſe have ſome or other of their pupils always ready placed towards objects nearly all around them: whence they are ſo far from being denied any benefit of this noble and moſt neceſſary ſenſe of ſight, that they have probably more of it than other creatures, anſwering to their neceſſities and ways of living.

II. As in man, and moſt other creatures, the eyes are ſituated in the head, becauſe, among other reaſons, it is the moſt convenient place for their defence and ſecurity, being compoſed of hard bones, wherein are formed two large, ſtrong ſinuſes, or ſockets, commonly called orbits, for the convenient lodging of theſe tender organs, and ſecuring them againſt external injuries; ſo in thoſe creatures whoſe head, like their eyes and the reſt of their body, is ſoft and without bones, nature hath provided for this neceſſary and tender organ, a wonderful kind of guard, by enduing the creature with a faculty of withdrawing his eyes into his head, and lodging them in the ſame ſafety within his body. We have a very beautiful example of this in ſnails, whoſe eyes are lodged in four horns, like atramentous ſpots, one at the end of each horn, which they can retract at pleaſure, when in any danger. Here it may be alſo obſerved, that the hardneſs of the cornea in all animals that want eye-lids, as fiſhes, exactly reſembles the horn of a lanthorn; and therefore is not hurt by ſuch particles as their eyes are commonly expoſed to. And in the mole, becauſe this animal lives under ground, it was neceſſary its eyes ſhould be well guarded and defended againſt the many dangers and inconveniencies to which its manner of living expoſes it: this is the reaſon why its eyes are ſo ſmall, and that they are ſituated ſo far in the head, and covered ſo ſtrongly with hair; and beſides they can protrude, and retract them at pleaſure.

III. The third and laſt reflection we ſhall make upon the external motion of our eyes, is what regards a problem which has very much perplexed both phyſicians and philoſophers, *viz.* What is the cauſe of the uniform motion of both eyes.

In ſome creatures, ſuch as fiſhes, birds, and among quadrupeds, the hare, cameleon, *&c.* the eyes are moved differently; the one towards one object, and the other towards another. But in man, ſheep, oxen, and dogs, the motions are ſo uniform, that they never fail to turn both towards the ſame place; hence in operations upon the eye that require it to be kept immoveable, ſometimes it is neceſſary to tie up the ſound eye with a compreſs, by which means the other is eaſier kept fixed and immoveable.

The final cauſe of this uniform motion is, 1. That the ſight may be thence rendered more ſtrong and perfect: for ſince each eye apart impreſſes the mind with an idea of the ſame object, the impreſſion muſt be more ſtrong and lively, when both eyes concur; and that both may concur, it is neceſſary that they move uniformly; for though the retina, or immediate object of viſion, be expanded upon the whole bottom of the eye, as far as the ligamentum ciliare, yet nothing is clearly and diſtinctly ſeen, but what the eye is directed to. 2. A ſecond advantage we reap from the uniform motion of the eyes, which is more conſiderable than the former, conſiſts in our being thereby enabled to judge with more certainty of the diſtance of objects. See the article VISION.

There is yet another advantage, full as conſiderable as any of the former, that is thought to ariſe from the uniform motion of our eyes, and that is, the ſingle appearance of objects ſeen with both our eyes; which, though at firſt view it does not appear probable, is true: for if in looking at an object, you impreſs one of your eyes aſide with your finger, and alter its direction, every thing will be ſeen double.

By the internal motions of the eye, we underſtand thoſe motions which only happen to ſome of its internal parts, ſuch as the cryſtalline and iris; or to the whole eye, when it changes its ſpherical figure, and becomes oblong or flat. The internal motions of our eyes are either ſuch as reſpect the change of conformation, that is neceſſary for ſeeing diſtinctly, at different diſtances, or ſuch as only reſpect the dilatation and contraction of the pupil.

That our eyes change their conformation, and accommodate themſelves to the various diſtances of objects, will be evident to any perſon, who but reflects on the manner and moſt obvious phænomena of viſion.

Authors are very much divided in their opinions with regard to the mechaniſm by which this change is introduced, as well as what parts it conſiſts in: for ſome are of opinion, that the whole globe changes its form, by being lengthened into an oblong figure, when objects are near, and by becoming flat, when they are removed to a greater diſtance; and others are of a quite contrary opinion.

With regard to the change of the cryſtalline, and the mechaniſm by which it is produced, ſome maintain, that according as objects are at different diſtances, this humour becomes more or leſs convex, which does indeed very well account for diſtinct viſion at all diſtances; for objects painted on a ſheet of white paper, by means of a lens placed in the hole of a window-ſhuter, in a dark room, have their images always diſtinct, at whatever diſtance they be from the window, provided that the lens be of a convexity anſwerable to that diſtance. See the article LENS, *&c.*

Others again are of opinion that the cryſtalline never changes its figure, but that it is moved to and from the retina, according to the diſtance or proximity of the object in view, and this alſo does equally well account for the diſtinct appearance of objects at all diſtances, as is evident from the laws of optics.

Diſeaſes of the EYE are, an ophthalmia, or inflammation of the eyes; the gutta ſerena, or amauroſis; a ſuffuſion, or cataract; an ectropium; a glaucoma; an amblyopia, or obſcurity of ſight, containing the myopia, the preſbytopia, the nyctalopia, and the amauroſis; the ſtrabiſmus, or ſquinting; an unguis, pannus, or pterygium of the membrane of the eye; the albugo, leucoma, or ſpot in the eye; a ſugillation of the eye; an epiphora, or rheum in the eyes; a trichiaſis, and the fiſtula lachrymalis. See each diſeaſe under its reſpective name.

Atoms and flies appearing before the EYES. Theſe images, or appearances, ariſe before the eyes from an obſtruction of the optic nerve, from the fine fibres of the retina, or from the ſmall veins contained therein, that is, they ſeem to be too much dilated, and are cured with difficulty; and eſpecially if they are inveterate, becauſe they are often the forerunners of a gutta ſerena; in the beginning they may be cured with ſuch things as open obſtructions, eſpecially thoſe medicines mentioned in the cure of the gutta ſerena. See GUTTA SERENA.

Defluxion on the EYE. For a watery eye, if it ariſes from a weakneſs of the lachrymal gland, it will be proper to uſe ſtrengtheners externally, as ſpirit of wine, Hungary water, ſpring water, fennel, or Valerian water, wherewith the parts adjoining are to be waſhed. Internally the abounding ſerum muſt be evacuated, or revulſed: if it be too ſharp, it muſt be corrected by balſamics, and medicines againſt catarrhs, ſuch as eſſence of amber, and decoction of the woods. The revulſion muſt be made by bliſters and iſſues.

Wounds in the EYES. If the eye is wounded, but not ſo as to let out the vitreous or cryſtalline humour, the following method will be of great ſervice. The wound ſhould be anointed, two or three times in a day, with a feather, or fine rag, well dipped in unguentum alabaſtrinum; and afterwards, a ſmall compreſs laid over it, being well ſaturated with a collyrium, made of the whites of two eggs, two ounces and a half of roſe water, half a drachm of oil of roſes, and three grains of camphor, well mixed together. The bowels ſhould alſo be kept looſe for ſome days, with cooling and opening medicines: if the patient is of a plethoric habit, blood ſhould be drawn from the neck or feet; all warm or ſharp things ſhould be thrown out of the patient's diet, and great care taken to keep him quiet. When the cryſtalline humour ſticks in the orifice of the wound, it ſhould be pulled out, that it may not bring on any deformity, or other miſchief. When the vitreous and cryſtalline humours are fallen out of the eye, not only the ſight but figure of the eye muſt be entirely deſtroyed, therefore, at firſt, it ſhould be dreſſed with compreſſes dipped in warm wine, and afterwards with ſome vulnerary balſam.

Contuſions of the EYE. When the eye is contuſed by any accident, it will be intirely deprived of ſight, except the contuſion is very ſmall, and proper remedies are inſtantly applied. If the eye therefore has received a ſlight contuſion, you may waſh it frequently, for the firſt day, with cold ſpring water, covering it with linen rags, wet with the ſame. On the next day, rub it externally with camphorated ſpirit of wine, covering it with ſtups wrung out of vinous decoctions of eye-bright, ſpeedwell, hyſſop, ſage, camomile-flowers, and fennel-ſeeds. If you cannot get theſe herbs, apply bolſters dipped in warm wine, renewing them often. If the contuſion is large, or the patient of a plethoric habit, you muſt open a vein.

To extract bodies fallen into the EYE. See the article EXTRACTION.

Scarification of the EYES. See the article SCARIFICATION.

Falling out of the EYE. See the article PROLAPSUS OCULI.

EYE-BROW. See the article BROW.

Artificial EYE, a kind of camera obſcura. See CAMERA OBSCURA.

EYE, in architecture, is uſed to ſignify any round window, made in a pediment, an attic, the reins of a vault, or the like.

EYE *of a dome*, an aperture at the top of a dome, as that of the Pantheon at Rome, or of St. Paul's at London: it is uſually covered with a lanthorn.

EYE *of the volute*, in architecture, is the center of the volute, or that point in which the helix, or ſpiral of which it is formed, commences: or it is the little circle in the middle of the volute, in which are found the thirteen centers for the deſcribing the circumvolutions of it.

EYE-BROW, in architecture, is uſed in the ſame ſenſe as liſt or fillet. See FILLET.

EYE, in agriculture and gardening, ſignifies a little bud, or ſhoot, inſerted into a tree, by way of graft.

EYE *of a tree*, a ſmall pointed knot to which the leaves ſtick, and from which the ſhoots or ſprigs proceed.

EYE-BRIGHT. See EUPHRASIA.

EYE *of a pear*, the extremity oppoſite to the ſtalk.

EYE-FLAP, in the manege, a little piece of leather, that covers the eye of a coach-horſe.

EYE *of the branch of a bridle*, the uppermoſt part of the branch, which is flat, with a hole in it, for joining the branch to the head-ſtall, and for keeping the curb faſt.

EYE *of a bean*, in the manege, a black ſpeck or mark in the cavity of the corner-teeth, which is formed there about the age of five and a half, and continues till ſeven or eight.

EYE *of the anchor*, on board a ſhip, the hole wherein the ring of the anchor is put into the ſhank.

EYE *of the ſtrap*, on board a ſhip, the ring or round which is left of the ſtrap to which any block is ſeized.

EYE, in printing, is ſometimes uſed for the thickneſs of the types; or more properly, it ſignifies the graving in relievo on the top of the letter, otherwiſe called its face: the eye of the *e* is the ſmall opening at the head of that letter, which diſtinguiſhes it from the *c*.

EYE, among jewellers, is uſed for the luſtre and brilliancy of precious ſtones, more commonly called the water. See WATER.

Bull's EYE, in aſtronomy, the ſame with aldebaran. See ALDEBARAN.

EYE-GLASS, in the microſcope. See the article MICROSCOPE.

Cat's EYE, in natural hiſtory, the ſame with aſteria. See the article ASTERIA.

Crab's EYE. See the article CRAB'S EYES.

Hare's EYE. See LAGOPHTHALMIA.

EYEMOUTH, or AYMOUTH, a port-town of Scotland, about ſix miles north of Berwick.

EYESS, or NYESS, among ſportſmen, denotes a young hawk juſt taken out of the neſt, and not able to prey for herſelf. See the article HAWK.

EYNDHOVEN, a town of dutch Brabant, about fifteen miles ſouth of Boiſleduc.

EYRAC, or IZACA-ARABIC, a province of Aſiatic Turky, ſituated on the river Euphrates, being the antient Chaldea or Babylonia.

EYRAC, or IRAC AGEM, the antient Parthia, now the principal province of Perſia, is ſituated almoſt in the center of that kingdom, its capital city being Iſpahan, the metropolis of the whole kingdom.

EYRE, or EIRE, in law, the court of itinerant juſtices. See JUSTICE.

EYSENACH, a city of Germany, in the circle of Upper Saxony: eaſt lon. 10° 12', and north lat. 51°.

EZAN, in the mahometan theology, a hymn containing the profeſſion of their faith, which is repeated five times a day, to call the people to prayers.

EZEKIEL, a canonical book of the Old Teſtament, referring chiefly to the degenerate manners and corruptions of the Jews of thoſe times.

It abounds with fine ſentences and rich compariſons, and diſcovers a good deal of learning in profane matters.

Ezekiel was carried captive to Babylon with Jechoniah, and began his prophecies in the fifth year of the captivity. He was contemporary with Jeremiah, who propheſied at the ſame time in Judea. He foretold many events, particularly the deſtruction of the temple, the fatal cataſtrophe of thoſe who revolted from Babylon to Egypt, and the happy return of the Jews to their own land.

Ezekiel's reed, or **rod**, a meaſure of length mentioned by that prophet, and computed to be nearly equal to two Engliſh feet.

EZRA, a canonical book of the Old Teſtament, comprehending the hiſtory of the Jews from the time of Cyrus's edict for their return, to the twentieth year of Artaxerxes Longimanus. It ſpecifies the number of Jews who returned, and Cyrus's proclamation for the rebuilding the temple, together with the laying its foundation, the obſtructions it met with, and the finiſhing thereof in the reign of Darius.

The illuſtrious author of this book, was alſo the reſtorer and publiſher of the canon of the Old Teſtament. See the articles Canon and Bible.

F.

F, the ſixth letter of the alphabet, and fourth conſonant, is by ſome reckoned a mute, and by others a ſemi-vowel: it is formed by forcing the breath out ſtrongly, and, at the ſame time, joining the upper teeth and under lip: it has much the ſame ſound with the greek φ, or *ph* in engliſh words, and is only written in words of latin origin, *ph* being uſed inſtead of it in thoſe derived from the Greek.

Suetonius tells us, that the emperor Claudius invented the *f*, and two other letters; and that it had the force of *v* conſonant, and was wrote inverted Ⅎ.

As a numeral, F denotes 40, and with a daſh over it thus F̄, 40000: in muſic, it ſtands for the baſs clef; and frequently for *forte*, as *ff* does for *forte forte*. See the articles Clef and Forte.

F, in medicine, ſtands for *fiat*, *let it be done:* thus F. S. A. ſtands for *fiat ſecundum artem*, let it be done according to art.

As an abbreviation, F ſtands for *filius*, *fellow*, and the like: thus F. R. S. ſignifies fellow of the royal ſociety.

FA, in muſic, one of the ſyllables invented by Guido Aretine, to mark the fourth note of the modern ſcale, which riſes thus, *ut, re, mi, fa*. See the articles Note and Gamut.

Muſicians diſtinguiſh two *fa*'s, *viz.* the flat, marked with a b, or ♭; and the ſharp or natural, marked thus ♮, and called bquadro. See Bquadro.

Fa finto, a feigned F, or a feint upon that note: this is the caſe of every note that has the mark ♭ before it; but more eſpecially *mi* and *ſi*, or our E and B, and is what we commonly call the flat of any note. See the article Flat.

FABA, the Bean, in botany, is comprehended by Linnæus among the viciæ. See the articles Vicia and Bean.

Faba bengalensis, in the materia medica, a roundiſh compreſſed ſubſtance, about an inch in diameter, brought from Bengal, and thought to be a vitiated fruit of the myrobalans kind. It is a very good aſtringent, and therefore preſcribed with great ſucceſs in fluxes and hæmorrhages.

Faba Sti. Ignatii, St. Ignatius's bean, in the materia medica, a dry and hard fruit, or rather kernel, preſcribed with good ſucceſs in vertigoes, lethargies, epilepſies, aſthmas, quartan agues, and worms, but ſhould be uſed with great caution. It is given in powder, 10 or 12 grains being the doſe, when intended to vomit the patient. In ſmaller quantities it acts as a ſudorific. Its tincture is ſafe even for children, and is ſaid to be one of the beſt medicines for their convulſions, and other diſorders ariſing from obſtructions of the primæ viæ.

Faba purgatrix, the fruit of a ſpecies of ricinus. See the article Ricinus.

FABER, in ichthyology, a fiſh of the zeus-kind, called in engliſh doree, or john doree. See the article Zeus.

It is diſtinguiſhed from the other ſpecies of zeus by its prickly belly, and ragged appearance. Its uſual length is from ſix to ten inches, and its breadth nearly half its length. See plate XCV. fig. 1.

FABIANS, *fabii*, in roman antiquity, a part of the Luperci. See Lupercalia.

FABLE, *fabula*, a tale or feigned narration, deſigned either to inſtruct or divert, diſguiſed under the allegory of an action, *&c.*

Fables were the firſt pieces of wit that made their appearance in the world, and have

Fig. 1. FABER.

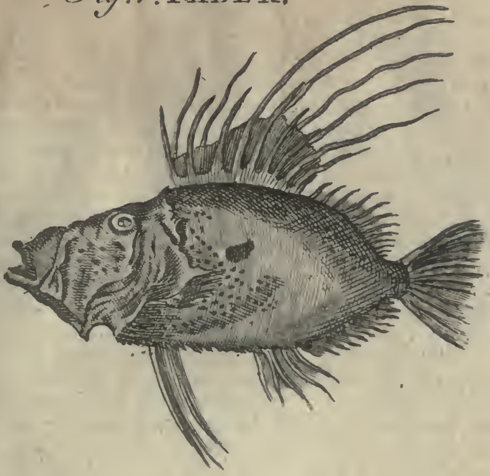


Fig. 2. FAGONIA.

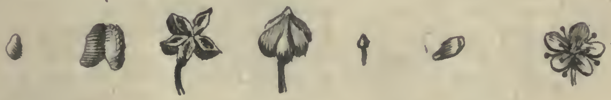
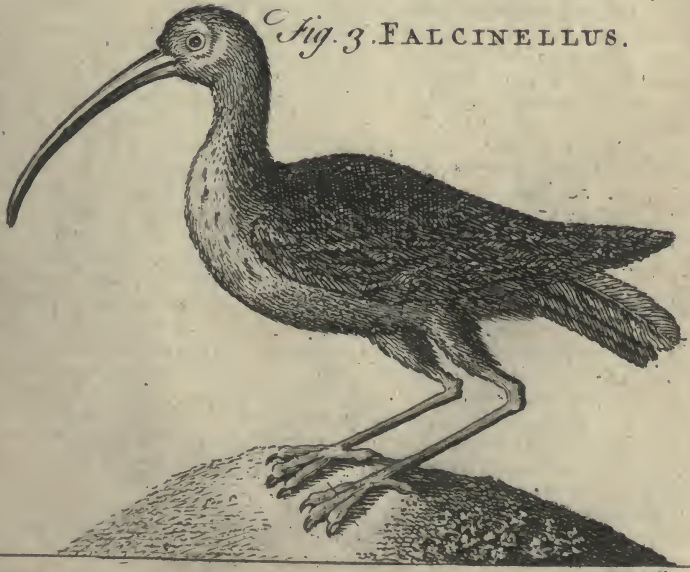


Fig. 3. FALCINELLUS.



J. Jefferys sculp

have been ſtill highly valued, not only in times of the greateſt ſimplicity, but among the moſt polite ages of the world. Jotham's fable of the trees is the oldeſt that is extant, and as beautiful as any that have been made ſince. Nathan's fable of the poor man is next in antiquity, and had ſo good an effect as to convey inſtruction to the ear of a king. We find Æſop, in the moſt diſtant ages of Greece; and in the early days of the roman commonwealth, we read of a mutiny appeaſed by the fable of the belly and the members. As fables had their riſe in the very infancy of learning, they never flouriſhed more than when learning was at its greateſt height; witneſs Horace, Boileau, and Fontaine. See APOLOGUE.

FABLE is alſo uſed for the plot of an epic or dramatic poem, and is, according to Ariſtotle, the principal part, and, as it were, the ſoul of a poem. See the articles DRAMA and EPIC.

In this ſenſe the fable is defined to be a diſcourſe invented with art, to form the manners by inſtruction, diſguiſed under the allegory of an action. Ariſtotle divides the fable into ſimple and compound: the ſimple having no change of fortune; and the compound having a turn from bad fortune to good, and from good to bad. The contrivance of each fable muſt have two parts, the intrigue and the diſcovery. The compound fable, according to Ariſtotle, pleaſes moſt, as having moſt variety.

Lord Bacon obſerves that the uſe of allegorical poetry is to envelope things, whoſe dignity deſerves a veil, as when the ſecrets and myſteries of religion, policy, and philoſophy are wrapped up in fables and parables. Others are of opinion that fable is ſo eſſential to poetry, that there is no poetry without it; the fable being as much the form and diſtinction of a poem, as the figure is to a piece of marble to denominate it a ſtatue. It is requiſite towards the perfection of a fable, that it be admirable and probable: however admirable the fable is, it can have no effect if it is not probable; and probability alone is too faint and dull for poetry, as what is only admirable is too extravagant and dazling. It is, therefore, of the utmoſt importance to be able to know how to mingle theſe in ſuch a juſt temperament as may pleaſe the fancy, without ſhocking the reaſon. The admirable is all that which is againſt the ordinary courſe of nature; the probable is whatever ſuits with the common opinion: but the moſt part of poets, by too great a paſſion to create admiration, take not ſufficient care to temper it with probability. Almoſt all the antient poets, however judicious otherwiſe, have been guilty of this fault, not to ſpeak of the moderns.

FABRIC, in general, denotes the ſtructure or conſtruction of any thing; but particularly of buildings, as a church, hall, houſe, &c. See BUILDING.

FABRIC-LANDS, thoſe formerly given towards rebuilding or repairing of cathedrals and other churches; for antiently almoſt every body gave more or leſs, by his will, to the fabric of the pariſh-church where he dwelt.

FABULOUS, ſomething conſiſting of, or connected with a fable. See FABLE.

FABULOUS AGE, among antient hiſtorians. See the article AGE.

FACE, *facies*, or *vultus*, in anatomy, comprehends all that part of the head which is not covered with the common long hair. See the article HEAD.

Of the parts common to the whole face are, 1. The epidermis and cutis, or ſkin, the colour and fineneſs of which conſtitutes the principal beauty of the face. 2. The fat, which being in conſiderable quantity, and frequently covered with a fleſhy pannicle, adds much to the beauty of the face. The parts proper to particular parts of the face are the muſcles and bones, which are deſcribed in their proper places: beſides which, we may likewiſe refer to the face, the organs of the ſenſes of ſeeing, hearing, taſting, and ſmelling. See the articles EYE, EAR, NOSE, PALATE, MOUTH, TONGUE, &c.

To theſe may be added the forehead, cheeks, temples, &c.

The chin is nothing but the angle of the lower jaw, with its fleſhy integuments. See the article MAXILLA.

FACE, or FACADE, in architecture, the front of a building, or the ſide which contains the chief entrance. Sometimes, however, it is uſed for whatever ſide preſents to the ſtreet, garden, court, &c. or is oppoſite to the eye.

FACE *of a ſtone*, in maſonry, that ſuperficies of it which lies in the front of the work. The workmen generally chooſe to make one of thoſe ſides the face, which, when in the quarry, lay perpendicularly to the horizon, and conſequently the breaking, not the cleaving way of the ſtone.

FACE, in fortification, an appellation given to ſeveral parts of a fortreſs, as the face of a baſtion, *&c.* See BASTION.

The face of a place is the front comprehended between the flanked angles of two neighbouring baſtions, being compoſed of a curtain, two flanks, and two faces; and is likewiſe called the tenaille of a place. In a ſiege, the attacks are carried on againſt both baſtions, when the whole tenaille is attacked.

Prolonged FACE, that part of the line of defence-razant, which is between the angle of the ſhoulder and the curtin, or the line of defence-razant, diminiſhed by the length of the face.

FACE *of a gun,* the ſuperficies of the metal at the extremities of the muzzle of the piece.

FACE, in the military art, a word of command, intimating to turn about: thus, *face to the right,* is to turn upon the left heel a quarter-round to the right; and, *face to the left,* is to turn upon the right heel a quarter-round to the left.

FACE *of plants,* among botaniſts, ſignifies their general appearance, which, being nearly the ſame in plants of the ſame genus, ſerves to diſtinguiſh them at firſt ſight. See BOTANY, PLANT, *&c.*

The ſame term, *face, facies,* is uſed by other naturaliſts to denote the like reſemblance among other objects, as fiſhes, birds, *&c.* However it is proper to remark, that this reſemblance is too fallacious to ſerve as a generical character; ſince things, belonging to very different genera, are ſometimes found to be very like each other in external appearance.

FACET, or FACETTE, among jewellers, the name of the little faces or planes to be found in brilliant and roſe diamonds. See the article DIAMOND.

FACETANUS LACERTUS, the ſame with the tarantula. See TARANTULA.

FACIA, or FASCIA. See FASCIA.

FACIES *Hippocratica,* in medicine, is when the noſtrils are ſharp, the eyes hollow, the temples low, the tips of the ears contracted, the forehead dry and wrinkled, and the complexion pale or livid. The facies hippocratica is chiefly obſerved towards the period of the phthiſes, and other conſumptions, and is held a ſure prognoſtic of death.

FACK, or FAKE. See the article FAKE.

FACTION, a cabal or party formed in a ſtate, city, or company.

FACTION, in antiquity, a name given to the different companies of combatants in the circus. They were four, *viz.* the white, the red, the green, and the blue; to which Domitian added another of purple colour. They were ſo denominated from the colour of the liveries they wore, and were dedicated, according to M. Aur. Caſſiodorus, to the four ſeaſons of the year, the green being conſecrated to ſpring, the blue to winter, the red to ſummer, and the white to autumn. It appears from antient inſcriptions, that each faction had its procurators and phyſician; and from hiſtory, that party-rage ran ſo high among them, that in a diſſenſion between two factions, in the time of Juſtinian, almoſt forty thouſand men loſt their lives in the quarrel.

FACTITIOUS, any thing made by art, in oppoſition to what is the produce of nature. Thus, factitious cinnabar is oppoſed to native cinnabar. See the article CINNABAR.

FACTOR, in commerce, is an agent or correſpondent reſiding beyond the ſeas, or in ſome remote part, commiſſioned by merchants to buy or ſell goods on their account, or aſſiſt them in carrying on their trade.

A factor receives from the merchants, his conſtituents, in lieu of wages, a commiſſion or factorage, according to the uſage of the place where he reſides, or the buſineſs he tranſacts, this being various in different countries, and on the purchaſes and ſales of different commodities. He ought to keep ſtrictly to the tenor of his orders, as a deviation from them, even in the moſt minute particular, expoſes him to make ample ſatisfaction for any loſs that may accrue from his non-obſervance of them: and it is very reaſonable it ſhould be ſo, as the diſtance of his ſituation renders him unable to judge of his principal's views and intention. When unlimited orders are given to factors, and they are left to ſell or buy on the beſt conditions they can, whatever detriment occurs to their conſtituents, they are excuſed, as it is to be preſumed they acted for the beſt, and were governed by the dictates of prudence. But a bare commiſſion to ſell is not ſufficient authority for the factor to truſt any perſon, wherefore he ought to receive the money on the delivery of the goods; and, by the general power, he may not truſt beyond one, two, or three months, *&c.* the uſual time allowed in ſales, otherwiſe he ſhall be anſwerable out of his own eſtate. If a factor ſells on the uſual truſt to a perſon of good credit, who afterwards

wards becomes inſolvent, he is diſcharged; but not if the man's credit was bad at the time of ſale. If a factor give a man time for payment of money contracted on ſale of his principal's goods, and, after that time is elapſed, ſell him goods of his own for ready money, and the man becomes inſolvent, the factor in equity ought to indemnify his principal, but he is not compellable by the common law. A factor ſhould always be punctual in the advices of his tranſactions, in ſales, purchaſes, freights, and more eſpecially in draughts by exchange: he ſhould never deviate from the orders he receives in the execution of a commiſſion for purchaſing goods, either in price, quality, or kind; and if, after goods are bought, he ſends them to a different place from what he was directed to, they muſt remain for his own account, except the merchant, on advice of his proceedings, admits them according to his firſt intention. A factor that ſells a commodity under the price he is ordered, ſhall be obliged to make good the difference: and if he purchaſes goods for another at a price limited, and afterwards they riſe, and he fraudently takes them for his own account, and ſends them to another part, in order to ſecure an advantage that ſeemingly offers, he will, on proof, be obliged, by the cuſtom of merchants, to ſatisfy his principal for damages. If a factor, in conformity with a merchant's orders, buys with his money, or on his credit, a commodity he ſhall be directed to purchaſe; and, without giving advice of the tranſaction, ſells it again to profit, and appropriates to himſelf the advantage, the merchant ſhall recover it from him, and beſides have him amerced for his fraud. When factors have obtained a profit for their principal, they muſt be cautious how they diſpoſe of it; for if they act without commiſſion, they are reſponſible: and if a merchant remits goods to his factor, and about a month after draws a bill on him, the factor, having effects in his hands, accepts the bill, then the principal breaks, and the goods are ſeized in the factor's hands for the behalf of the creditors, it has been conceived the factor muſt anſwer the bill notwithſtanding, and come in a creditor for ſo much as he was obliged, by reaſon of his acceptance, to pay. A factor who enters into a charter-party with a maſter for freight, is obliged by the contract; but if he loads aboard generally, the principal and the lading are liable for the freightment, and not the factor. If a factor, having money in his hands belonging to his principal, neglect to inſure a ſhip and goods, according to order, if the ſhip miſcarry, the factor, by the cuſtom of merchants, ſhall make good the damage; and if he make any compoſition with the inſurers after inſurance, without orders ſo to do, he is anſwerable for the whole inſurance.

As fidelity and diligence are expected from the factor, ſo the law requires the like from the principal; if, therefore, a merchant remits counterfeit jewels to his factor, who ſells them as if true; if he receive loſs or prejudice by impriſonment or other puniſhment, the principal ſhall not only make full ſatisfaction to the factor, but to the party who bought the jewels.

What is here ſaid of factors, is meant of ſuch as reſide abroad to act for merchants, and may be applied to ſupercargoes, who go a voyage to diſpoſe of a cargoe, and afterwards return with another to their principals: but it is alſo the cuſtom of the merchants of the higheſt credit throughout the world, to act mutually in the capacity of factors for each other. The buſineſs ſo executed is called commiſſion-buſineſs, and is generally deſirable by all merchants, provided they have always effects in their hands, as a ſecurity for all the affairs which they tranſact for the account of others. And this claſs of traders of eſtabliſhed reputation, have current as well as commiſſion account, conſtantly between them, and draw on, remit to, and ſend commiſſions to each other only by the intercourſe of letters which, among men of honour, are as obligatory and authoritative as all the bonds and ties of law.

FACTOR, in multiplication, a name given to the multiplier and multiplicand, becauſe they conſtitute the product. See the article MULTIPLICATION, *&c.*

FACTORAGE, called alſo commiſſion, is the allowance given to factors by the merchant who employs them. The gain of factorage is certain, however the voyage or ſale prove to the merchant: but the commiſſions vary; at Jamaica, Barbadoes, Virginia, and moſt of the weſtern parts of the world the commiſſion runs at 8 *per cent.* generally through Italy, 2½; in France, Spain, and Portugal, *&c.* 2; and in Holland, and other places near home, 1½ *per cent.*

FACTORY is a place where a conſiderable number of factors reſide, to negotiate for their maſters and employers. See the article **Factor.**

The moſt conſiderable factories belonging to the Britiſh are thoſe eſtabliſhed in the Eaſt-Indies, Portugal, Turky, *&c.*

FACTUM, in arithmetic, the product of two quantities multiplied by each other.

FACULÆ, in aſtronomy, certain bright and ſhining parts, which the modern aſtronomers have, by means of teleſcopes, obſerved upon or about the ſurface of the ſun: they are but very ſeldom ſeen. See the article **Sun.**

FACULTY, in law, a privilege granted to a perſon, by favour and indulgence, of doing what, by law, he ought not to do.

For granting theſe privileges, there is a court under the archbiſhop of Canterbury, called the court of the faculties, the chief officer whereof is ſtyled maſter of the faculties, who has a power of granting diſpenſations in divers caſes, as to marry without the bans being firſt publiſhed; to eat fleſh on days prohibited; to ordain a deacon under age; for a ſon to ſucceed his father in his benefice; a clerk to hold two or more livings, *&c.*

Faculty, in the ſchools, a term applied to the different members of an univerſity, divided according to the arts and ſciences taught there: thus in moſt univerſities there are four faculties, *viz.* 1. Of arts, which include humanity and philoſophy. 2. Of theology. 3. Of phyſic. And, 4. Of civil law. The degrees in the ſeveral faculties of our univerſities are thoſe of batchelor, maſter, and doctor. See the articles **Degree**, **Batchelor**, *&c.*

Faculty *of advocates*, a term applied to the college or ſociety of advocates in Scotland, who plead in all actions before the court of ſeſſion. They meet in the beginning of every year, and chooſe the annual officers of the ſociety, *viz.* dean, treaſurer, clerks, private and public examinators, and a curator of their library. The manner of admiſſion into the faculty of advocates is by a trial in the civil law, and ſcotch law: the perſon deſiring to be admitted, having, upon petition, obtained a recommendation to the dean of the faculty, he giveth a remit to the private examinators, who are nine in number, and who, after their election, having divided the body of the civil law into nine parts, each taking one, appoint a diet for examination: in this diet there muſt be at leaſt ſeven preſent, each of whom examines the candidate; and the queſtion being afterwards put, Qualified, yea or no? they give their opinion by balloting, upon which the candidate is either admitted by ſigning his petition, or remitted to his ſtudies. After the private trial, the dean of the faculty aſſigns the candidate a title of the civil law, for the ſubject of a theſis, which being diſtributed among the advocates, the faculty meet on a day appointed, when three at leaſt of fifteen public examinators diſpute againſt the theſis; and afterwards the faculty give their opinions by balloting, as in the private trial. If the candidate is found qualified, the dean aſſigns him a law for an harangue before the lords, which harangue being made, he is admitted a member of the faculty, upon paying the fees, taking the oaths to the government, and an oath to be faithful in his office.

Faculty is alſo uſed to denote the powers of the human mind, *viz.* underſtanding, will, memory, and imagination. See the articles **Understanding**, *&c.*

The doctrine of the uſe and objects of the mental faculties, ſays lord Bacon, has two parts well known, *viz.* logic and ethics, the one producing reſolutions and the other actions. The imagination, indeed, on both ſides performs the office of agent or embaſſador, and aſſiſts alike in the judicial and miniſterial capacity. Wolfius, in his Analyſ. Pſycholog. after eſtabliſhing the exiſtence of the ſoul, conſiders it with reſpect to its faculty of underſtanding, which he diſtinguiſhes into ſuperior and inferior. The inferior comprehends perception, the ſource of ideas, thought, imagination, the power of feigning, memory, forgetfulneſs, and recollection. The ſuperior part of the faculty of underſtanding conſiſts in attention and reflection, in underſtanding in general, and its three operations in particular, and in the natural diſpoſitions of the underſtanding. The ſecond general faculty of the ſoul, is that of deſiring an object, conſidered as a good; from whence reſults the contrary determination, when it is looked upon as an evil. This faculty he alſo diſtinguiſhes into inferior and ſuperior: the firſt is nothing elſe than the ſenſitive appetite, the deſire or averſion we entertain for objects, when we allow ourſelves to be guided by the confuſed ideas of our ſenſes; hence ariſe the paſſions: the ſuperior part is the will, conſidered ſo far as it is determined by diſtinct ideas, exempt from all mechanical impreſſions;

and the uſe we make of this power of determining, is liberty.

FÆCES, in chemiſtry, the groſs matter, or ſediment, that ſettles at the bottom after diſtillation, fermentation, and the like.

The fæces of wine are more generally known by the name lees. See LEES.

FÆCES, in medicine, the excrements voided by ſtool. See EXCREMENT.

FÆCULA, in pharmacy, a form of medicine, conſiſting of the fæces of vegetable juices, principally thoſe of roots; the manner of making which may be gathered from the following example, as ordered in the college diſpenſatory. To make a fæcula of bryony, take the roots of that plant, any quantity; let them be ſcraped ſmall with a knife, and ſqueeze out their juice with a preſs; after ſtanding a few hours, in veſſels that are without any motion, there will be a white ſediment like ſtarch, and it muſt be dried in glazed pans, after the watery part is poured off by inclination.

After the ſame manner is prepared the fæcula of arum, wild radiſh, orrice, and the like.

FÆCULENT, in general, is applied to things abounding with fæces, or dregs: thus the blood and other humours of the human body, are ſaid to be fæculent, when without that purity which is neceſſary to health.

FAENZA, a city and biſhop's ſee of Italy, ſituated in the Pope's territories, about thirty miles eaſt of Bologna: eaſt long. 12° 38′, and north lat. 44° 30′.

FAGARA, in the materia medica, a fruit brought from the Eaſt Indies, much reſembling the cubeb. This fruit is a berry, the exterior bark whereof is black and duſky, of an acrid aromatic taſte: this berry, when ripe, being cut open, exhibits a dark, ſhining, ſolid ſeed, without either taſte or ſmell. It is recommended againſt frigidities in the liver; it aſſiſts concoction, is an aſtringent and ſtomachic.

FAGG, in the ſea-language, a term given to the end of thoſe ſtrands which do not go through the tops, when a cable or rope is cloſed.

FAGGOT, in times of popery here, was a badge worn on the ſleeve of the upper garment of ſuch perſons as had recanted, or abjured what was then termed hereſy; being put on after the perſon had carried a faggot, by way of penance, to ſome appointed place of ſolemnity. The leaving off the wear of this badge was ſometimes interpreted a ſign of apoſtacy.

FAGGOTS, among military men, perſons hired by officers, whoſe companies are not full, to muſter and hide the deficiencies of the company; by which means they cheat the king of ſo much money.

FAGONA, in anatomy, a conglomerate gland, the ſame with thymus. See the article THYMUS.

FAGONIA, the CRETIC-TREFOIL, in botany, a genus of the decandria-monogynia claſs of plants, the corolla of which conſiſts of five cordated patent petals, with long ſlender ungues inſerted in the cup; the fruit is a roundiſh acuminated capſule compoſed of ten valves, which form five lobes, and as many compreſſed cells; the ſeed is ſingle, and of a roundiſh figure. See plate XCV. fig. 2.

FAGOTTINO, in muſic, is a ſingle curtail, a muſical inſtrument ſomething like the baſſoon. See the article BASSOON.

FAGOTTO, in muſic, the double curtail, or in reality a double baſſoon, as big again as the former. See the preceding article.

FAGUS, the BEECH, in botany, a genus of the monœcia-polyandria claſs of plants, having no corolla; the ſtamina are generally twelve hairy filaments of the length of the cup; the antheræ are oblong; the fruit is a roundiſh capſule, very large, ſurrounded with ſoft prickles, compoſed of four valves, and containing only one cell; the ſeeds are two, roundiſh, acuminated, and three-cornered. This genus comprehends the common cheſnut-tree.

FAILLIS, in heraldry, a french term denoting ſome failure or fraction in an ordinary, as if it were broken, or a ſplinter taken from it.

FAILURE, a ſpecies of bankruptcy, commonly called breaking, or ſtopping payments. See BANKRUPTCY.

FAILURE *of record*, in law, is where an action is brought againſt a perſon, who alledges, in his plea, matter of record in bar of the action, and avers to prove it by the record; to which the plaintiff replies, *Nul tiel record, viz.* There is no ſuch record: whereupon the defendant has a day given him by the court to bring it in; and if he fails to do it, he is then ſaid to fail of his record, and the plaintiff ſhall thereon have judgment.

Where the tenor only of a record *&c.* is brought in, or is no bar to the plaintiff's action, the party likewiſe fails of his record; but ſmall variances in a record may be amended, and are no failure of record.

FAINT-ACTION, in law, a feigned action, or ſuch as, although the words of the writ are true, yet, for certain cauſes, the plaintiff has no title to recover thereby.

FAINT-PLEADER, in law, a covinous, falſe, or colluſory manner of pleading, to the deceit of a third perſon.

FAINTING. See LIPOTHYMIA.

FAIR, a greater kind of market, granted to a town, by privilege, for the more ſpeedy and commodious providing of ſuch things as the place ſtands in need of. See the article MARKET.

It is incident to a fair, that perſons ſhall be free from being arreſted in it for any other debt contracted than what was contracted in the ſame; or, at leaſt, promiſed to be paid there. Theſe fairs are generally kept once or twice a year, and, by ſtatute, they ſhall not be held longer than they ought, by the lords thereof, on pain of their being ſeized into the king's hands, *&c.* Alſo proclamation is to be made, how long they are to continue; and no perſon ſhall ſell any goods after the time of the fair is ended, on forfeiture of double the value, one fourth to the proſecutor, and the reſt to the king. There is a toll uſually paid in fairs, on the ſale of things, and for ſtallage, picage, *&c.* See the article TOLL.

Fairs abroad are either free, or charged with toll and impoſition. The privileges of free fairs conſiſt chiefly, firſt, in that all traders, *&c.* whether natives or foreigners, are allowed to enter the kingdom, and are under the royal protection, exempt from duties, impoſitions, tolls, *&c.* Secondly, that merchants, in going or returning, cannot be moleſted or arreſted, or their goods ſtopped. They are eſtabliſhed by letters-patent from the prince. Fairs, particularly free fairs, make a very conſiderable article in the commerce of Europe, eſpecially that of the Mediterranean, and inland parts of Germany, *&c.*

The principal Britiſh fairs are, 1. Sturbridge-fair, near Cambridge, by far the greateſt in Britain, and perhaps in the world. 2. Briſtol has two fairs, very near as great as that of Sturbridge. 3. Exeter. 4. Weſt Cheſter. 5. Edinburgh. 6. Wheyhill; and, 7. Burford-fair, both for ſheep. 8. Pancras fair, in Staffordſhire, for ſaddle-horſes. 9. Bartholomew fair, at London, for lean and welch black cattle. 10. St. Faith's, in Norfolk, for ſcotch runts. 11. Yarmouth fiſhing fair for herrings, the only fiſhing fair in Great Britain. 12. Ipſwich butter-fair. 13. Woodborough-hill, in Dorſetſhire, for weſt country manufactures, as kerſeys, druggets, *&c.* 14. Two cheeſe-fairs at Chipping-Norton: with innumerable other fairs, beſides weekly markets, for all ſorts of goods, as well our own as of foreign growth.

Among the principal free fairs in France are thoſe of St. Germains, Lyons, Rheims, Charters, Rouen, Bourdeaux, Troyes, Bayonne, Dieppe, *&c.*

The moſt noted fairs in Germany are thoſe of Francfort, Leipſic, and Nurenburg, not only on account of the great trade, but the vaſt concourſe of princes of the empire, nobility, and people, who come to them from all parts of Germany to partake of the diverſions to be had.

FAIRFIELD, a town of New-England, in the province of Connecticut, about an hundred miles ſouth-weſt of Boſton: weſt long. 72°, and north lat. 41°.

FAIRFORD, a market-town, about nineteen miles ſouth-eaſt of Glouceſter.

FAIRY, in antient traditions and romances, ſignifies a ſort of deity, or imaginary genius, converſant on earth, and diſtinguiſhed by a variety of fantaſtical, actions, either good or bad.

The fairies are a pecular ſpecies of divinities, that have but little relation to any of thoſe of the antient Greeks or Romans, unleſs perhaps to the larvæ; though others, with great reaſon, will not have them ranked among gods, but ſuppoſe them an intermediate kind of beings, neither gods, angels, men, or devils. They are of oriental extraction, and ſeem to have been invented by the Perſians and Arabs, whoſe religion and hiſtory abound with relations concerning them: theſe have a particular country which they ſuppoſe the fairies to inhabit, called Fairy-land.

Spencer's Fairy Queen is an epic poem, under the perſons and characters of fairies. In this ſort of writing, the poet loſes ſight of nature, and entertains the reader's imagination with the characters of fairies, witches, magicians, dæmons, and departed ſpirits. It requires an odd turn of thought, and a peculiar caſt of fancy, with an imagination naturally fruitful and ſuperſtitious.

This ſort of poetry raiſes a pleaſing kind of horror in the mind of the reader, and amuſes his imagination with the ſtrangeneſs and novelty of the perſons who are repreſented in it; but the judicious object to it, as not having probability enough to affect the imagination.

Fairy-circle, or **ring**, a phænomenon pretty frequent in the fields, *&c.* ſuppoſed, by the vulgar, to be traced by the fairies in their dances: there are two kinds of it, one of about ſeven yards in diameter, containing a round bare path, a foot broad, with green graſs in the middle of it. The other is of different bigneſs, encompaſſed with a circumference of graſs, greener and freſher than that in the middle. Meſſ. Jeſſop and Walker, in the Philoſophical Tranſact. aſcribe them to lightening, which is confirmed by their being moſt frequently produced after ſtorms of that kind, as well as by the colour and brittleneſs of the graſs-roots, when firſt obſerved.

Lightening, like all other fires, moves round, and burns more in the extremity than in the middle: the ſecond circle ariſes from the firſt, the graſs burnt up growing very plentifully afterwards. Others maintain that theſe circles are made by ants, which are frequently found in great numbers therein.

FAIT, in law, the ſame with deed. See the article Deed.

FAITH, *fides*, in antiquity, was deified by the Romans, and had a temple in the capitol.

Public faith is repreſented on medals ſometimes with a baſket of fruit in one hand, and ſome ears of corn in the other; and ſometimes holding a turtle-dove. But the moſt uſual ſymbol, is with her two hands joined together.

Faith, in divinity and philoſophy, the firm belief of certain truths upon the teſtimony of the perſon who reveals them.

The grounds of a rational faith are, 1. That the things revealed be not contrary to, though they may be above natural reaſon. 2. That the revealer be well acquainted with the things he reveals. 3. That he be above all ſuſpicion of deceiving us.

Where theſe criterions are found, no reaſonable perſon will deny his aſſent: thus, we may as well doubt of our own exiſtence, as of the truth of a revelation coming from God, who can neither be deceived himſelf, nor deceive others by propoſing things to be believed, that are contradictory to the faculties he has given us. Whatever propoſitions, therefore, are beyond reaſon, but not contrary to it, are, when revealed, the proper matter of faith.

Confeſſion of Faith. See Confession.

FAITHFUL, an appellation aſſumed by the mahometans. See Mahometans.

FAKE, among ſailors, ſignifies one round or circle of a cable or hawſer, coiled up out of the way.

FAKENHAM, a market-town of Norfolk, about ſixteen miles north-weſt of Norwich.

FAKIR, in pagan theology, a kind of indian monks, who even outdo the mortifications and ſeverities of the antient chriſtian anachorets. See Anachoret. Some of them mangle their bodies with ſcourges and knives; others never lie down; and others remain all their lives in one poſture.

There are alſo another kind of fakirs, who do not practiſe ſuch ſeverities: theſe flock together in companies, and go from village to village, propheſying and telling fortunes. It is ſaid that even perſons of fortune, in India, become fakirs, and that there are more than two millions of them.

FALCADE, in the manege, the motion of a horſe when he throws himſelf upon his haunches two or three times, as in very quick corvets; which is done in forming a ſtop and half ſtop. See the article Stop.

FALCATED, ſomething in the form of a ſickle: thus, the moon is ſaid to be falcated when ſhe appears horned. See the articles Moon and Phases.

FALCINELLUS, a bird ſuppoſed to be of the heron kind, with a long crooked bill, and called by ſome the black heron. See plate XCV. fig. 3.

It is ſomewhat larger than a pigeon, and is of a greeniſh colour, variegated with purple.

FALCO, in ornithology, a genus of birds, of the order of the accipitres, with three toes always before, and only one behind.

This genus comprehends the falcon-kind, properly ſo called, the hawk, gyrfalcon, eagle, buzzard, pygargus, lannar, kite, keſtril, *&c.* See the articles Falcon, Hawk, *&c.*

FALCON, or *Gentle* Falcon, the yellow-legged falcon, with a grey body ſpotted with brown, and with five or ſix broad and black faſciæ or waves on the tail. It is a very beautiful bird, about the ſize of a raven, and though very bold and voracious, is eaſily made tame and tractable. Mr. Edwards has deſcribed two falcons brought from Hudſon's bay, both about the bigneſs of the common crow. One of theſe is brown on the upper part of the body, and the under part is whitiſh, variegated with creſcent-like ſpots of a dark colour. The other is of a black, or very dark duſky colour, on the upper part of the body; the ridge of the wing, in the upper part, is white, and the whole under ſide is of a dirty clay colour, with black ſpots at the ends of the feathers. See plate XCVI. fig. 1. which repreſents the firſt of theſe.

In the choice of a falcon, take one that has wide noſtrils, high and large eyelids, a large black eye, a round head, ſomewhat full on the top; barb feathers under the clap of the beak, which ſhould be ſhort, thick, and of an azure colour; the breaſt large, round, and fleſhy; and the thighs, legs, and feet large and ſtrong, with the ſear of the foot ſoft and bluiſh: the pounces ſhould be black, with wings long and croſſing the train, which ſhould be ſhort and very pliable.

FALCON, in gunnery, a piece of cannon. See the article CANNON.

FALCONER, one who tames, manages, and looks after falcons, or other hawks. See the next article.

A falconer ſhould be well acquainted with the quality and mettle of his hawks, that he may know which of them to fly early, and which late. Every night, after flying, he ſhould give them caſting; one while plumage, ſometimes pellets of cotton, and at another time phyſic, as he finds neceſſary. He ought alſo every evening to make the place clean under the perch, that by her caſting he may know whether ſhe wants ſcouring upwards or downwards. Nor muſt he forget to water his hawk every evening, except ſuch days wherein ſhe has bathed; after which, at night, ſhe ſhould be put into a warm room, having a candle burning by her, where ſhe is to ſit unhooded, if ſhe be not ramage, that ſhe may prune and pick herſelf.

A falconer ſhould always carry mummy, and other medicines, into the field where a hawk frequently meets with accidents. Neither muſt he forget to take with him any of his hawking implements; and it is neceſſary he ſhould be ſkilful in making lures, hoods of all ſorts, jeſſes, bewets, and other furniture. Neither ought he to be without his coping-irons, to cope his hawk's beak when overgrown, and to cut her pounces and talons as there ſhall be occaſion; nor ſhould his cauting-irons be wanting.

FALCONRY, the art of training all manner of hawks, but more eſpecially the larger ſort, called falcons, to the exerciſe of hawking. See HAWKING.

When a falcon is taken, ſhe muſt be ſeeled in ſuch a manner, that as the ſeeling ſlackens, ſhe may ſee what proviſion lies before her; but care ought to be taken, not to ſeel her too hard. A falcon or hawk newly taken, ſhould have all new furniture, as new jeſſes of good leather, mailled leaſhes with buttons at the end, and new bewets. There ſhould alſo be provided a ſmall round ſtick, to ſtroke the hawk; becauſe the oftener this is done, the ſooner and better will ſhe be manned. She muſt alſo have two good bells, that ſhe may be found when ſhe ſcattereth. Her hood ſhould be well faſhioned, raiſed and emboſſed againſt her eyes, deep, and yet ſtrait enough beneath, that it may faſten about her head without hurting her; and her beak and talons muſt be a little coped, but not ſo near as to make them bleed.

If it be a ſoar-falcon, which hath already paſſed the ſeas, ſhe will indeed be harder to reclaim, but will prove the beſt of falcons. Her food muſt be good and warm, and given her twice or thrice a day, till ſhe be full gorged: the beſt for this purpoſe is pigeons, larks, or other live birds; becauſe ſhe muſt be broken off by degrees from her accuſtomed feeding. When ſhe is fed, you muſt hoop and lure, as you do when you call a hawk, that ſhe may know when you intend to give her meat. On this occaſion ſhe muſt be unhooded gently, and after giving her two or three bits, her hood muſt be put on again, when ſhe is to get two or three bits more. Care muſt be taken that ſhe be cloſe ſeeled, and after three or four days, her diet may be leſſened; the falconer ſetting her every night to perch by him, that he may awaken her often in the night. In this manner he muſt proceed, till he find her to grow tame and gentle; and when ſhe begins to feed eagerly, he may give her a ſheep's heart. He may now begin to unhood her in the day-time, but it muſt be far from company, firſt giving her a bit or two, then hooding her gently, and giving her as much more. When ſhe is ſharp ſet, he may now unhood her, and give her ſome meat juſt againſt his face and eyes, which will make her leſs afraid of the countenances of others. She muſt be borne continually on the fiſt, till ſhe is properly manned, cauſing her to feed in company, giving her in the morning, about ſun riſe, the wing of a pullet; and, in the evening, the foot of a hare or coney, cut off above the joint, flead and laid in water, which being ſqueezed, is to be given her with the pinion of a hen's wing. For two or three days give her waſhed meat, and then plumage in more or leſs quantity, as ſhe is thought to be more or leſs foul within. After this, being hooded again, ſhe is to get nothing till ſhe has gleamed and caſt, when a little hot meat may be given her in company; and, towards evening, ſhe may be allowed to plume a hen's wing in company alſo. Cleanſe the feathers of her caſting, if foul and ſlimy; if ſhe be clean within, give her gentle caſtings; and when ſhe is well reclaimed, manned, and made eager and ſharp ſet, he may venture to feed her on the lure.

However, three things are to be conſidered before the lure be ſhewed her. 1. That ſhe be bold and familiar in company, and not afraid of dogs and horſes. 2. Sharp ſet and hungry, having regard to the hour of morning and evening, when you would lure her. 3. Clean within, and the lure well garniſhed with meat on both ſides; and when you intend to give her the length of a leaſh, you muſt abſcond yourſelf.

She muſt alſo be unhooded, and have a bit or two given her on the lure as ſhe ſits on your fiſt: afterwards take the lure from her, and hide it that ſhe may not ſee it; and when ſhe is unſeeled, caſt the lure ſo near her, that ſhe may catch it within the length of her leaſh, and as ſoon as ſhe has ſeized it, uſe your voice as falconers do, feeding her upon the lure, on the ground, with the heart and warm thigh of a pullet.

Having ſo lured your falcon, give her but little meat in the evening; and let this luring be ſo timely, that you may give her plumage, and a juck of a joint next morning on your fiſt. When ſhe has caſt and gleamed, give her a little reaching of warm meat. About noon, tie a creance to her leaſh; and going into the field, there give her a bit or two upon her lure: then unwind the creance, and draw it after you a good way; and let him who has the bird hold his right hand on the taſſel of her hood, ready to unhood her as ſoon you begin to lure; to which if ſhe come well, ſtoop ſoundly upon it, and haſtily ſeize it, let her caſt two or three bits thereon. Then unſeizing and taking her off the lure, hood her and give her to the man again; and, going farther off, lure and feed her as before.

In this manner is the falconer to proceed, luring her every day farther and farther off, till ſhe is accuſtomed to come freely and eagerly to the lure; after which ſhe may be lured in company, taking care that nothing afright her. When ſhe is uſed to the lure on foot, ſhe is to be lured on horſeback; which may be effected the ſooner, by cauſing horſemen to be about her when ſhe is lured on foot.

When ſhe is grown familiar to this way, let ſomebody on foot hold the hawk, and he on horſeback muſt call and caſt the lure about his head, the holder taking off the hood by the taſſel; and if ſhe ſeize eagerly on the lure without fear of man or horſe, then take off the creance, and lure her at a greater diſtance. And if you would have her love dogs as well as the lure, call dogs when you give her her living or plumage. See the article HAWKING.

FALDAGE, an antient privilege reſerved to lords, of ſetting up folds for ſheep in any fields within their manors, for the better manurance of the ſame; and this, in former times, was uſually done as well with their tenants ſheep, as with their own.

FALDFEY, or FALDFEE, a rent or fee paid by ſome cuſtomary tenants, for liberty to fold their ſheep on their own lands.

FALKIRK, a town of Scotland: weſt long. 3° 48′, north lat. 56° 20′.

FALL, the deſcent of a heavy body towards the center of the earth. See the articles DESCENT, GRAVITY, ACCELERATION, &c.

FALL is alſo the name of a meaſure of length uſed in Scotland, and containing ſix ells of that country. See the articles MEASURE and ELL.

FALL, in the ſea-language, that part of the rope of a tackle, which is hauled upon.

Alſo when a ſhip is under ſail, and keeps not ſo near the wind as ſhe ſhould do, they ſay ſhe falls off; or when a ſhip is not fluſh, but hath riſings of ſome parts of her decks more than others, it is called falls.

LET FALL. See the article LET.

FALLACY, a deception, fraud, or falſe appearance.

The epicureans deny that there is any ſuch thing as a fallacy of the ſenſe: for according to them, all our ſenſations and perceptions, both of ſenſe and phantaſy, are true: whence they make ſenſe the primary criterion of truth. See EVIDENCE.

The carteſians, on the other hand, maintain, that we ſhould ſuſpect as falſe, or, at moſt, dubious, every thing that preſent themſelves to us by means only of our external ſenſes, becauſe they ſo frequently deceive us. They add, that our ſenſes, as being fallacious, were never given us by nature for the diſcovery of truth, or the contemplation of the principles of things, but only for pointing out to us what things are convenient or hurtful to our bodies. See EXISTENCE.

The peripatetics keep a middle courſe: they ſay, that if a ſenſible object be taken in its common or generical view, the ſenſe cannot be deceived about it; but that if the object be taken under its ſpecific view, the ſenſe may be miſtaken about it, from the want of the diſpoſitions neceſſary to a juſt ſenſation, as a diſorder in the organ, or any thing uncommon in the medium: thus in ſome diſorders of the eye, all objects appear yellow; a ſtick in water appears broken or crooked, *&c.*

FALLACY, or *ſyllogiſtical* **FALLACY**, in logic, a captious argument, which, on account of its apparent goodneſs and defect, is made uſe of to deceive a reſpondent not well verſed in the art of ſophiſtry. See the article SOPHISM.

Fallacies either ariſe from words or things. The foundation of all fallacy in words, is an ambiguity; but that of fallacy in things, is very numerous.

FALLING-SICKNESS, the ſame with epilepſy. See the article EPILEPSY.

FALLING-STAR, in meteorology. See the article STAR.

FALLOPIAN TUBES, two canals of a tortuous figure, but approaching to a conic form, joined to the fundus of the uterus, one on each ſide.

They are connected cloſely and continuouſly to the uterus, and more laxly to the ovaries by the alæ veſpertilionum, and finally to the oſſa ilei, by the ligamenta lata: their length is different, ſix, ſeven, or eight fingers breadth, and ſometimes more: their thickneſs about the middle is equal to that of one's little finger; their extremities are ſmaller, that next the uterus is very ſmall; it opens into its cavity, and may be inflated by blowing into the uterus: or a ſmall ſtyle may be thruſt up into it: their ſmall extremity is connected to the uterus, the other is free, and fluctuates about the abdomen: this is larger and is fimbriated, or fringed round the edges; and when there is occaſion, this extremity applies itſelf to the ovary, embracing it with theſe muſcular ſegments or fringes.

Their ſubſtance is membranaceous and cavernous: they are compoſed of a double membrane, the exterior one ſeems to be continuous with the peritonæum, and the interior with the interior membrane of the uterus. They are wrinkled on the inner ſurface, and are imbued with a lubricous humour; but they are not cellulous in the human body as in beaſts. They are furniſhed with a great number of veſſels, and have a cavernous ſubſtance between their membranes, by means of which they are rendered rigid in applying their mouths to the ovary. They are alſo moiſtened on their inner ſurface by theſe veſſels.

Their uſe in generation is very great; they become erect in the time of the coitus, from the influx of the blood and ſpirits, and at that time, by a natural motion, they apply their looſe fringed extremities to the ovaries, which are ſurrounded and imbraced by them. In this ſtate they convey to them the prolific matter of the male ſemen injected into the womb; and after one of the ovula is impregnated, they receive and convey it to the womb. The fallopian tubes are eaſily diſcovered in hens and other birds, and are called oviducts. See a repreſentation of one of them in plate XCVII. fig. 1.

FALLOW, a pale red colour, like that of brick half burnt: ſuch is that of a fallow-deer. See the article DEER.

FALLOW-FIELD, or **FALLOW-GROUND**, land laid up, or that has lain untilled for a conſiderable time.

FALLOW-FINCH, or **FALLOW-SMICH**, a bird otherwiſe called oenanthe. See the article OENANTHE.

FALLOWING *of land*, a particular method of improving land.

The great benefit of fallowing, appears by the common practice of landlords, who every where take care to oblige their tenants to a ſtrict obſervance of it once in three years; few lands being able to bear two crops without it.

It appears that none will find a year's fallowing a loſs to them, let their land be what it will; but, more particularly, the advantage of fallowing conſiſts in, firſt, its laying of the land in ridges, and its expoſing it to the froſt, wind, ſun and dews, all which ſweeten and mellow the land very much; the often ſtirring of it, and breaking the clots, diſpoſe it for the bearing of good crops. Secondly, it kills the weeds, by turning up the roots to the ſun and air; and kills not only the weeds that grew with the laſt corn, but wild oats, darnel, and other weeds that ſow themſelves, and that as ſoon as they begin to peep out of the ground; ſo that they have no time to ſuck out any of the heart of the land.

The way of ordering fallow-lands is, after the crop is off, to let the land lie all winter, and what graſs and weeds grow on it, to eat off with ſheep in April, or the beginning of May. As ſoon as they have done ſowing of corn, they begin to plow up their fallows. This firſt fallowing in many places, ought to be very ſhallow, well turned, and clapped cloſe together, becauſe the thinner the turf is, the eaſier will it dry through, and kill the weeds, eſpecially if the weather be dry: but, in ſome places, where there is a very cold clay, that will not bear corn well without being expoſed to the heat of the ſun to warm it, they plow their firſt plowing the depth they deſign to go. About June is the time of the ſecond plowing, which they call twy-fallowing; at which plowing, you muſt go your full depth. About the latter end of July, or the beginning of Auguſt, is the time of try-fallowing, or laſt plowing, before they ſow their rye or wheat: but ſome plow up their land oftener.

If the land riſe full of clots, and if it is a binding land, you muſt make it fine by harrowing of it, when rain comes; but then you muſt not let it lie long before you ſtrike, ſiſe, or plow it up into ſmall ridges, eſpecially if it is wet land; and as near as you can, leave no weeds, turfs, or graſs unkilled, or unbroke with your harrows. But if your land will diſſolve well with the froſt, it is beſt to let it lie a little rougher, eſpecially if you deſign to ſow it with barley; for the rougher it lies for a winter-fallowing, the better. If the winter does not diſſolve the clots, which it will not do in binding lands, you muſt wait rain for the fallowing of it. Where the land is but indifferent, and manure is not to be got, fallowing every other year is found a great improvement. In ſome places they take a crop of wheat, and a crop of peaſe, and ſo fallow their land again.

FALMOUTH, a port-town of Cornwall, in England, ſituated in weſt long. 5° 30′, north lat. 50° 15′, on a fine bay of the engliſh channel, the entrance whereof is guarded by two forts.

FALSE, in general, ſomething contrary to truth, or not what it ought to be: thus we ſay a falſe witneſs, falſe action, falſe weights, falſe claim, *&c.* See the articles WITNESS, ACTION, *&c.*

FALSHOOD, in philoſophy, an act of the underſtanding repreſenting a thing otherwiſe than it is as to its accidents.

Crimen falſi, in the civil law, is fraudulent ſubornation or concealment with deſign to darken or hide the truth, and make things appear otherwiſe than they are. The crimen falſi is committed, 1. By words, as when a witneſs ſwears falſely. 2. By writing, as when a man antedates a contract, or the like. 3. By deed, as when he ſells by falſe weights and meaſures.

FALSIFYING, in law, the proving a thing to be falſe.

The falſifying a record, is where a perſon purchaſes land of another, who is afterwards outlawed for felony; in this caſe, he may falſify the record as to the time when the felony is ſuppoſed to have been committed, and alſo as to the point of the offence. But in the caſe where a perſon is found guilty by verdict, ſuch purchaſer ſhall only falſify the time.

To falſify a recovery, may be done by the iſſue in tail, where it is ſuffered by a tenant for life.

FALSO JUDICIO, in law, a writ which lies for falſe judgment given in the county court, court baron, or other court, not of record. See the article FALSE JUDGMENT.

FALSO RETURNO BREVIUM, a writ that lies againſt a ſheriff for falſe returning of writs he had got to execute.

FALSO BORDONE, in muſic, denotes the burden or ground baſs of a ſong when it is not exact to the rules of harmony. It is alſo applied by the Italians to a certain harmony produced by the accompaniments of ſeveral ſixths following one another, which make ſeveral fourths between two higher parts, becauſe the third part is obliged to make tierces with the baſs.

FALX, in anatomy, a proceſs of the dura mater placed between the two hemiſpheres

ſpheres of the brain, and reſembling a reaper's ſickle.

FAMAGOUSTA, a city of aſiatic Turky, ſituated on the eaſt end of the iſland of Cyprus.

FAMES canina, an exceſſive appetite. See the article Bulimy.

FAMILIARS *of the inquiſition*, are people that aſſiſt in the apprehending of ſuch perſons as are accuſed, and to carry them to priſon; upon which occaſion, the unhappy perſon is ſurrounded by ſuch a number of theſe officious gentlemen, that there is no poſſibility of eſcaping out of their hands. As a reward of this baſe employ, the familiars are allowed to commit the moſt enormous actions, to debauch, aſſaſſinate, and kill, with impunity. See the article Inquisition.

FAMILY, *familia*, denotes the perſons that live together in one houſe, under the direction of one head or chief manager. It alſo ſignifies the kindred or lineage of a perſon, and is uſed by old writers for a hide or portion of land ſufficient to maintain one family. See the article Hide.

Family, in natural hiſtory, a term uſed by authors to expreſs any order of animals, or other natural productions of the ſame claſs. See the articles Class and Order.

Family *curves*. See Curve.

FAN, a machine uſed to raiſe wind and cool the air by agitating it. The cuſtom which now prevails of wearing fans, was borrowed from the Eaſt, where they are almoſt indiſpenſably neceſſary for keeping off the ſun and the flies. Fans are made of a thin ſkin or piece of paper, taffaty, or other light ſtuff, cut ſemicircularly, and mounted on ſeveral little ſticks of wood, ivory, tortoiſeſhell, or the like. The paper, &c. is uſually painted, and in mounting is plaited in ſuch a manner, as that the plaits may be alternately inward and outward. That this machine was known to the antients, we may infer from what Terence ſays, *cape hoc flabellum, & ventulum huic ſic facito*. It was compoſed of different materials, but the moſt elegant were made of peacocks feathers, or perhaps were ſo painted as to repreſent a peacock's tail.

Fan is alſo an inſtrument uſed in winnowing corn.

Fans for corn pay on importation 1s. $3\frac{40}{100}$d and draw back on exportation, 1s. $1\frac{50}{100}$d. India fans pay for every 100 l. groſs value at the ſale 26 l. 14 s. $2\frac{52\frac{5}{8}}{100}$d. The drawback on exportation is 25 l. 2 s. $11\frac{51\frac{3}{8}}{100}$d.

FANATICS, wild, enthuſiaſtic, viſionary perſons, who pretend to revelation and inſpiration.

The antients called thoſe fanatici who paſſed their time in temples (fana) and being often ſeized with a kind of enthuſiaſm, as if inſpired by the divinity, ſhewed wild and antic geſtures. Prudentius repreſents them as cutting and ſlaſhing their arms with knives: ſhaking the head was alſo common among the fanatici; for Lampridius informs us, that the emperor Heliogabulus was arrived to that pitch of madneſs, as to ſhake his head with the gaſhed fanatics. Hence the word was applied amongſt us to the anabaptiſts, quakers, &c. at their firſt riſe, and is now an epithet given to the modern prophets, muggletonians, &c.

FANIONS, in the military art, ſmall flags carried along with the baggage.

FANO, a biſhop's ſea and port-town of Italy, ſituated on the gulph of Venice, in 14° eaſt longitude, and 44° north latitude.

FAPESMO, a form of ſyllogiſm, wherein the major or firſt propoſition is an univerſal affirmative, the minor an univerſal negative, and the concluſion a particular negative.

FAQUIR, or Fakir. See Fakir.

FAR, in horſemanſhip, an appellation given to any part of a horſe's right ſide: thus the far foot, far ſhoulder, &c. is the ſame with the right foot, right ſhoulder, &c.

FARCE, was originally a droll or petty ſhew exhibited by mountebanks and their buffoons in the open ſtreets, to gather the people together. At preſent it is of more dignity: it is removed from the ſtreet to the theatre, and inſtead of being performed by merry-andrews to amuſe the rabble, is acted by comedians, and become the entertainment of a polite audience. Poets have reformed the wildneſs of the primitive farces, and brought them to the taſte and manner of comedy. The difference between the two on our ſtage is, that comedy keeps to nature and probability, and therefore is confined to certain laws preſcribed by antient critics, whereas farce diſallows of all laws, or rather ſets them aſide on occaſion. Its end is purely to make merry, and it ſticks at nothing which may contribute thereto, however wild and extravagant. Hence the dialogue is uſually low, the perſons of inferior rank, the fable or action trivial

vial or ridiculous, and nature and truth every where heightened and exaggerated to afford the more palpable ridicule.

FARCEY, or FARCIN. See FARCIN.

FARCIMINALIS TUNICA, in anatomy, the ſame with the allantois. See the article ALLANTOIS.

FARCIN, FARCY, or FASHIONS, in farriery, a creeping ulcer, and the moſt loathſome, ſtinking, and filthy diſeaſe that a horſe can be affected with.

It proceeds from corrupt blood engendered in the body by over-heats and colds, and begins firſt with hard knots and puſtules, which at length over-run the horſe's whole body. Its origin is commonly in a vein, or near ſome maſter vein, which feeds and nouriſhes the diſeaſe.

Sometimes it is occaſioned by ſpur galling, with ruſty ſpurs, ſnaffle-bit, or the bit of another horſe infected with the ſame diſeaſe.

For the cure, firſt bleed the horſe well; then take oil of bay and euphorbium mixed together, and anoint the knots with it; or bathe the place with the ſtale of an ox or cow, and the herb called lion's foot, all boiled together. Some apply tallow and horſe-dung, burn the knots with a hot iron, or waſh the ſore with ſalt, vinegar, alum, verdigreaſe, green copperas, and gun-powder, boiled in chamber lee. Others again anoint the ſores with a ſalve made of a penny-worth of tar, two pennyworth of white mercury, and two handfuls of pigeons dung.

Water FARCIN, a ſwelling under a horſe's belly and chaps, which, being pierced with a hot iron, yields abundance of yellow, grey, and oily water. It proceeds from a horſe's feeding in low watery grounds, or in pits and holes where the graſs grows above water.

The common way of curing this malady, is by letting out the matter of the ſwelled parts with a long-iron-rod, heated red hot; waſhing the parts with chamber-lee and ſalt, mixed with ſome powder of bole armenic, and made as hot as may be endured, for three or four times.

FARDING-DEAL, the fourth part of an acre of land. See the article ACRE.

FARE, moſt commonly ſignifies the money paid for a voyage, or paſſage by water; but, in London, it is what perſons pay for being conveyed from one part of the town to another in a coach or chair. See the articles COACH, WATERMEN, *&c.*

FAREHAM, a market-town of Hampſhire, ten miles eaſt of Southampton.

FAREWELL CAPE, the moſt ſoutherly promontory of Greenland, in 50° weſt long. and 60° north lat.

FARINA, a latin term ſignifying meal, or the flour of corn. See CORN.

FARINA FOECUNDANS, amongſt botaniſts, the impregnating meal or duſt on the apices or antheræ of flowers; which being received into the piſtil, uterus, or ſeed-veſſel of plants, fecundates the rudiments of the ſeeds in the ovary, which otherwiſe would decay and come to nothing. See the article GENERATION *of plants*.

FARINGTON, a market-town of Berkſhire, 25 miles north-weſt of Reading.

FARM, or FERM, ſignifies the chief meſſuage in a village, or any large meſſuage, whereto belongs land, meadow, paſture, wood, common, *&c.* and which has been uſed to let for term of life or years, under a certain yearly rent payable by the tenant for the ſame.

In different parts of the country, a farm is called by different appellations: in Lancaſhire, it is termed ferm hold; in Eſſex, a wike; and in the north, a tack. According to ſome, a farm ſhould make three rents, or its produce ſhould amount to three times the rent, one for the landlord, another for the charge of cultivating, and the third for the farmer and his family to live on.

FARMER, the perſon who occupies or is leſſee of a farm, whether for life or years. See the articles FARM and LEASE.

Huſbandman is the proper addition of a farmer, huſbandry being the myſtery or art he profeſſes.

FARMER, among miners, ſignifies the lord of the field, or the perſon who farms the lot and cope of the king.

FARNHAM, a market-town in the county of Surry, ten miles weſt of Guilford, remarkable for its large plantations of hops.

FARO, a ſea-port town of Portugal, in the province of Algarva: weſt long. 9°, north lat. 36° 50′.

FARREATION, or CONFARREATION, in antiquity. See CONFARREATION.

FARRIER, one whoſe employment is to ſhoe horſes, and cure them when diſeaſed or lame.

FARRIER'S POUCH, a leather-bag, in which are contained nippers, drivers, ſhoes for all ſizes of feet, good ſharp nails, and all the implements for new ſhoeing a horſe that has loſt his ſhoe upon the road.

A gentleman on a journey ought to have one of theſe pouches well provided, and a groom that knows how to drive nails.

FARRIERY, the art of trimming the feet, and curing diſeaſed horſes. See HORSE.

FARS, or FARSISTAN, the antient Perſis, being a province of Perſia lying northward of the gulph of Perſia. Its chief town is Schiras.

FARTHING, the leaſt copper-coin uſed in Britain, being half of the half-penny. See the article COIN.

FASCES, in roman antiquity, axes bound up together with rods or ſtaves, and carried before the roman magiſtrates as a badge of their authority and office.

The uſe of the faces was introduced by the elder Tarquin, as a mark of ſovereign authority: in after times they were borne before the conſuls, but by turns only, each his day. They had twelve of them carried by ſo many lictors.

After the conſuls, the prætors aſſumed them, and Cenſorinus obſerves they had only two, though Plutarch and Polybius give them ſix. In the government of the decemviri, it was the practice at firſt for only two of them to have the faſces. Afterwards, each of them had twelve, in the ſame manner as the kings.

FASCETS, in the art of making glaſs, are the irons thruſt into the mouths of bottles, in order to convey them into the annealing tower.

FASCIA, in architecture, ſignifies any flat member having a conſiderable breadth and but a ſmall projecture, as the band of an architrave, larmier, &c.

Faſcias, in brick buildings, are certain juttings out of the bricks over the windows of each ſtory, except the upper one. Theſe are ſometimes plain, like thoſe of columns; but ſometimes they are moulded, and the moulding is uſually a ſcima reverſa at the bottom, above which are two plain courſes of bricks, then an aſtragal, and, laſtly a boultine. See the articles ASTRAGAL and BOULTINE.

FASCIA LATA, in anatomy, called alſo muſculus membranoſus, is a muſcle of the tibia or leg, ariſing fleſhy from the anterior part of the anterior and ſuperior ſpine of the ileum. Soon after its origin it becomes intirely membranaceous, and cloſely ſurrounds the muſcles of the thigh; after which it is inſerted in the upper part of the tibia, near the head of the fibula, and from thence ſends out an aponeuroſis almoſt over the whole tibia.

The faſcia lata ſerves to draw back the thigh, and to elevate both this and the leg; it is therefore, as well as ſome other of the adjacent muſcles, common to both the thigh and the leg.

FASCIÆ, in aſtronomy, certain parts on jupiter's body reſembling belts or ſwaths. They are more lucid than the reſt of that planet, and are terminated by parallel lines, ſometimes broader and ſometimes narrower. Mr. Huygens obſerved a faſcia in mars much broader than thoſe of jupiter, and poſſeſſing the middle part of his diſk, but very obſcure.

FASCIALIS, in anatomy, a muſcle of the leg called alſo ſartorius. See the article SARTORIUS.

FASCICULUS, in medicine, denotes a handful, or according to ſome, as much as can be taken up between the finger and the thumb.

FASCINATION, a kind of witchcraft or enchantment ſuppoſed to operate by the influence either of the eye or tongue.

To the firſt kind of faſcination, Virgil alludes in his third eclogue, *neſcio quis teneros oculus mihi faſcinat agnos.* To the ſecond, in his ſeventh eclogue, in theſe lines.

Aut, ſi ultra placitum laudarit, baccare frontem
Cingite, ne vati noceat mala lingua futuro.

FASCINES, in fortification, faggots of ſmall wood of about a foot diameter and ſix feet long, bound in the middle and at both ends. They are uſed in raiſing batteries, making chandeleers, in filling up the moat to facilitate the paſſage to the wall, in binding the ramparts where the earth is bad, and in making parapets of trenches to ſcreen the men.

Faſcines are ſometimes pitched over, to be thrown upon the enemies works in order to ſet them on fire. They differ from ſauciſſons, being made of ſmall wood, whereas the ſauciſſons are made of branches of trees. See the article SAUCISSON.

See alſo faſcines ſupported by a chandeleer in plate XCVII. fig. 2.

FASHION, a term uſed among artificers in gold and ſilver, for the trouble, time, and labour employed in a piece of work. It is by the faſhion that workmen's wages are regulated.

FASHION-PIECES, in the ſea-language, are two compaſſing pieces of timber, into which is fixed on each ſide the tranſom. See the article TRANSOM.

FAST, or FASTING, in general denotes the abſtinence from food; but is more parti-

Fig.1. FALLOPIAN TUBE.

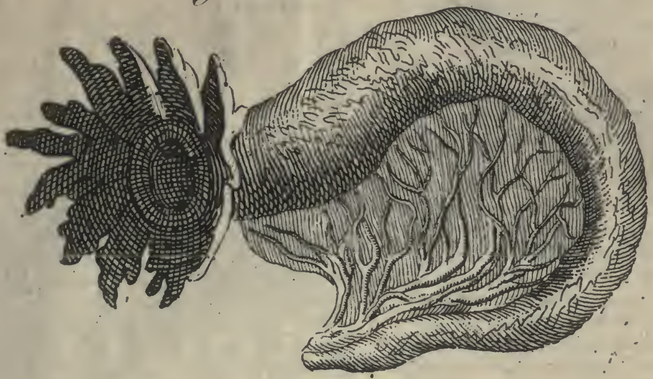


Fig 2 FASSCINES.

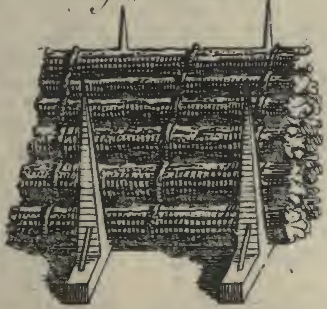


Fig.3. FESSE.

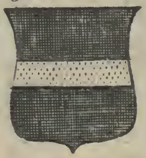
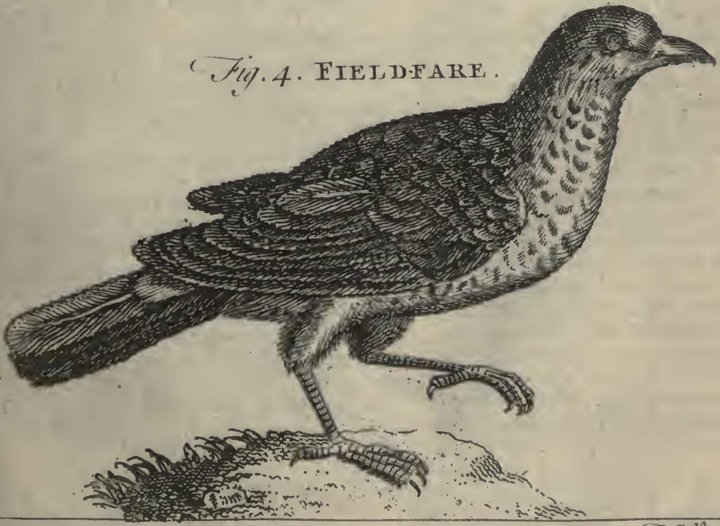


Fig.4. FIELD-FARE.



T. Jefferys sculp

particularly uſed for ſuch abſtinence on a religious account.

Solemn faſts have been obſerved in all ages and nations, eſpecially in times of mourning and affliction.

Among the Jews, the calamities for which faſting was enjoined, were a ſiege, the ſword, peſtilence, locuſts, the caterpillar, diſeaſes, famine, and the like. Upon theſe days, they wore ſack-cloth next the ſkin, their cloaths were rent, and they wore no ſhoes: they likewiſe ſprinkled aſhes upon their heads, and neither waſhed their hands, nor anointed their bodies with oil, as uſual.

The Greeks and Romans, and, in ſhort, every nation of antiquity, had their ſtated as well as occaſional faſts.

The antient chriſtians had two ſorts of ſolemn faſts, *viz.* weekly and annually; the former being obſerved every Wedneſday and Friday, and the latter during lent. See the articles LENT and STATIONARY DAYS.

The church of England, greek and roman churches, &c. have likewiſe their ſtated and occaſional faſts. But, by a ſtatute of queen Elizabeth, it is enacted, that whoſoever by preaching, teaching, writing, &c. affirms it to be neceſſary to abſtain from fleſh, for the ſaving of the ſoul of man, or for the ſervice of God, ſhall be puniſhed as a ſpreader of falſe news.

Faſting is likewiſe enjoined by the mahometan religion, witneſs their ramadan or lent; and even the pagans of India have ſeveral remarkable faſts. See the article RAMADAN.

FAST-DAYS, thoſe appointed, by public authority, to be obſerved in faſting and humiliation.

FAST-GROUND, or **FAST-COUNTRY**, among miners, denotes the ſame with ſhelf. See the article SHELF.

FASTERMANS, among our ſaxon anceſtors, were pledges or bondſmen, who were anſwerable for each others good behaviour.

FASTI, in roman antiquity, the calendar wherein were expreſſed the ſeveral days of the year, with their feaſts, games, and other ceremonies.

There were two ſorts of faſti, the greater and leſs; the former being diſtinguiſhed by the appellation *faſti magiſtrales*, and the latter by that of *faſti calendares*.

The greater faſti contained the feaſts, with every thing relating to religion and the magiſtrates. The leſſer were again diſtinguiſhed into the city and country faſti, each adapted to the people for whom they were deſigned. In all theſe faſti, the court days, or thoſe whereon cauſes might be heard and determined, were marked with the letter F; theſe days were called faſti, from *fari*, to ſpeak or pronounce; and the other days, not marked with this letter, were called nefaſti.

FASTI CONSULARES, was alſo a tablet or chronicle, wherein the ſeveral years were denoted by the reſpective conſuls, with the principal events that happened during their conſulſhip. And hence, the term faſti is ſtill applied to the archives and public regiſters of a nation.

FAT, in anatomy, an oleaginous or butyraceous matter, ſecreted from the blood, and filling up the cavity of the adipoſe cells. Fat, properly and diſtinctly ſo called, is not ſecreted from glandules, but from the little arteries of the adipoſe membrane. Authors diſtinguiſh it into two kinds, which they expreſs by the words ſevum or adeps, and pinguedo. According to this diſtinction, there is no ſuch thing as ſevum or hard fat in the human body, its fat being all of that ſort expreſſed by pinguedo, or ſoft and oily. That this oleaginous matter has a circulatory motion, or an egreſs into the veins, is very evident from the ſudden conſumption of it in many diſeaſes, and from its vaſt diminution by exerciſe, or labour.

The uſes of fat are, 1. To ſerve as a kind of covering to the body, in order to defend it from cold and other injuries. 2. To defend the more tender and ſenſible parts from being too ſtrongly vellicated by the ſalts. 3. To preſerve in good order the flexion of the muſcles, of the cutis, and of the other parts between and about which it is placed. 4. To facilitate the motions of ſome parts, as the eyes, jaws, &c. 5. To fill up a number of empty interſticial ſpaces, and by that means to add greatly to the ſymmetry and beauty of the parts; as is evidently the caſe in the face, the neck, &c. and to facilitate the diſtention of the parts, the ſpaces between which it thus fills up.

There is evidently a great uſe of the fat about the vagina, the anus, the oſſa iſchii, and pudenda; which filling up many large ſpaces there, gives way greatly in the diſtenſion of thoſe parts in the excluſion of the fœtus, and even of the harder excrements. 6. To prevent the painful preſſure and attrition of the parts, particularly in the ſoles of the feet, the nates, and other the like parts; in all which the fat is copiouſly diſpoſed, and ſerves in the place of a cuſhion for the muſcular fleſh to reſt upon. 7. And, finally, there is great reaſon to ſuppoſe, that when the body does not receive nouriſhment in the uſual way, the regreſs of the fat into the veins ſupplies that defect.

The fat of ſeveral animals, as a gooſe, dog, viper, bear, and even that of mankind, are met with preſcribed in the intention of ſuppuratives and digeſtives; for being of a penetrating nature, they are ſuppoſed to diſſolve and rarify the incloſed humours, and bring them to what is called maturity. See the articles SUPPURATIVES and RIPENERS.

The beſt way of preparing fat for medicinal uſe, is to free it from ſkins, veins, fibres, &c. and after waſhing it till it becomes unbloody, to melt, ſtrain, and preſerve it from air.

FAT, in the ſea-language, ſignifies the ſame with broad. Thus a ſhip is ſaid to have a fat quarter, if the truſſing in or tuck of her quarter be deep.

FAT is alſo uſed for ſeveral utenſils, as 1. A great wooden veſſel, uſed for the meaſuring of malt, and containing a quarter or eight buſhels. 2. A large brewing-veſſel, uſed by brewers to run their wort in. 3. A leaden pan or veſſel for the making of ſalt at Droitwich.

FAT likewiſe denotes an uncertain meaſure of capacity. Thus a fat of iſinglaſs contains from 3 ¼ hundred weight to 4 hundred weight; a fat of unbound books, half a maund or four bales; of wire, from 20 to 25 hundred weight; and of yarn, from 220 to 221 bundles.

FATE, *fatum*, denotes an inevitable neceſſity depending upon a ſuperior cauſe. The Greeks called it ειμαρμενη, as it were a chain or neceſſary ſeries of things indiſſolubly linked together. It is alſo uſed to expreſs a certain unavoidable deſignation of things, by which all agents, both neceſſary and voluntary, are ſwayed and directed to their ends. See the article NECESSITY.

In this laſt ſenſe, fate is diſtinguiſhed into, 1. Aſtrological, ariſing from the influence and poſition of the heavenly bodies, which (it is ſuppoſed) give laws both to the elements and mixed bodies, and to the wills of men. 2. Stoical fate, defined by Cicero an order or ſeries of cauſes, wherein cauſe being linked to cauſe, each produces another, and thus all things flow from one prime cauſe. To this fate, the ſtoics ſubject even the gods.

Fate is divided by later authors into phyſical and divine.

Phyſical fate, is an order and ſeries of natural cauſes appropriated to their effects. By this fate it is that fire warms, bodies communicate motion to each other, &c. and the effects of it are all the events and phænomena of nature. See NATURE.

Divine fate, is what is more uſually called providence. See PROVIDENCE.

FATES, *parcæ*, in mythology. See the article PARCÆ.

FATHER, *pater*, a term of relation denoting a perſon who hath begot a child. By the laws of Romulus, a father had an unlimited power over his children. Amongſt the Lacedæmonians, as we learn in Ariſtotle's politics, the father of three children was excuſed from the duty of mounting guard for the ſecurity of the city; and a father of four children, was exempted from every public burden. The poppæan law amongſt the Romans, granted many noble privileges to the fathers of three children, amongſt which one was, that he ſhould be excuſed from civil offices, and that the mother ſhould have liberty, in her father's life-time, to make a will, and manage her eſtate without the authority of tutors.

Natural FATHER, is he who has illegitimate children.

FATHER IN LAW, a perſon who has married a woman, who has children by a former marriage.

FATHER, in theology, is uſed in ſpeaking of the firſt perſon of the trinity. See the article TRINITY.

FATHER is alſo uſed in ſpeaking of ſpiritual and moral things. Thus, Abraham is called the father of the faithful.

FATHER in church-hiſtory, is applied to antient authors who have preſerved in their writings the tradition of the church. Thus St. Chryſoſtom, S. Baſil, &c. are called Greek fathers, and St. Auguſtine and St. Ambroſe latin fathers. No author who wrote later than the twelfth century is dignified with the title of Father.

FATHER is alſo a title of honour given to prelates and dignitaries of the church, to the ſuperiors of convents, to congregations of eccleſiaſtics, and to perſons venerable for their age or quality. Thus we ſay the right reverend father in God, the father general of the benedictines, the fathers of the council of Nice, father of his country, &c.

FATHER-LASHER, a name given by the people of Cornwall to a fiſh of the cottus-kind, with the upper jaw longeſt, and a prickly head. See COTTUS.

FATHOM, a long meaſure containing ſix feet, chiefly uſed at ſea for meaſuring the length of cables and cordage.

FATNESS. See the article CORPULENCY.

FATUUS IGNIS, in phyſiology, a meteor, otherwiſe called will with a wiſp. See the article WILL.

FAVIFORM, in general, ſomething reſembling a honey-comb. Surgeons, give this appellation to certain ulcers, which emit a ſanies thro' little holes, eſpecially in the head.

FAVISSÆ, in antiquity were according to Feſtus and Gellius, ciſterns to keep water in: but the faviſſæ in the capitol at Rome were dry ciſterns, or ſubterraneous cellars, where they laid up the old ſtatues, broken veſſels, and other things uſed in the temple. Theſe were much the ſame with what in ſome of the modern churches are called the archives and treaſury.

FAUNALIA, in roman antiquity, three annual feſtivals in honour of the God Faunus, the firſt of which was obſerved on the ides of February; the ſecond on the 16th of the calends of March; and the third on the nones of December. The principal ſacrifices on this occaſion were lambs and kids. Faunus was a deity of the Romans only, being wholly unknown to the Greeks. Virgil makes him a God of oracles and predictions. Horace calls him the guardian and protector of men and wit, and recommends to him the care of his eſtate. Ovid repreſents this deity with horns on his head, and crowned with the pine-tree. It is ſuppoſed the roman Faunus was the ſame with the greek Pan.

FAUNS, *fauni*, a kind of rural deities, among the antient Romans, repreſented with horns on their heads, ſharp pointed ears, and the reſt of their bodies like goats; they were the ſons of Faunus. See the preceding article.

The Fauni, when they met any perſon, would terrify and ſtupify him with their very looks; and were the frequent cauſe of miſcarriages to big-bellied women; they were thought to inhabit the woods together with the nymphs and ſatyrs.

FAVORITO, in muſic, as *choro favorito*, a chorus, in which are employed the beſt voices and inſtruments, to ſing the recitatives, play the ritornella's, &c. this is otherwiſe called the little chorus, or choro recitante.

FAUSSE-BRAYE, in fortification, a ſmall rampart without the true one, about three or four fathom wide, and bordered with a parapet and banquette.

The deſign of a fauſſe-braye is to defend the foſſe: it is not reckoned ſo uſeful, where there is a dry moat, becauſe the beſieged may make better works for the defence of it than a fauſſe-braye, ſuch as traverſes, ſcillons and coffers; but in places ſurrounded with a wet ditch, a fauſſe-braye is more uſeful, provided it be made only before the curtain and flanks; for lying low, it cannot be eaſily hurt by the enemies cannon, and it defends the foſſe better, becauſe of its low ſituation, than the true rampart, which on account of its height cannot ſo well diſcover the foſſe: fauſſe-brayes ought never to be made before the faces, eſpecially in places faced with brick, or ſtone, becauſe the breach being generally made in the face, the ruins and rubbiſh of the rampart are ſtopped in the fauſſe-braye, which facilitates the aſcent of the breach, and in places lined with brick or ſtone, the pieces of ſtone or brick fly among the ſoldiers that are in the fauſſe-braye. See the article FORTIFICATION.

FAWN, among ſportſmen, a buck, or doe, of the firſt year; or the young one of the buck's breed in its firſt year.

FAYAL, one of the Azores-iſlands. See the article AZORES.

FE, or *St.* FE, the capital of New Mexico: weſt long. 109°, north lat. 36°.

St. FE *de bagota*, the capital of the kingdom of New Granada: weſt long. 73°, north lat. 4°.

It is an archbiſhopric and the ſeat of the governor of the province, &c.

St. FE is alſo a town of Spain, in the province of Granada, ſituated on the river Xemil: weſt long. 3° 45′, north lat. 37° 20′.

St. FE is alſo the capital of a province of the ſame name of Terra Firma in South America, ſituated on the river of St. Martha, 200 miles ſouth of Carthagena: weſt. long. 77°, north lat. 7° 25′.

FEALTY, in law, an oath taken on the admittance of any tenant, to be true to the lord of whom he holds his land: by this oath the tenant holds in the freeſt manner, on account, that all who have fee, hold *per fidem & fiduciam*, that is, by fealty at the leaſt.

This fealty, at the firſt creation of it, bound the tenant to fidelity, the breach of which was the loſs of his fee. It has been divided into general and ſpecial: general, that which is to be performed by every ſubject to his prince; and ſpecial, required only of ſuch as, in reſpect of their fee, are tied by oath to their lords. To all manner of tenures, except tenancy at will, and frank-almoign, fealty is incident, though it chiefly belongs to copyhold eſtates, held in fee and for life. The form of this oath by ſtat. 17 Ed. II. is to run as follows. "I *A. B.* will be to you my lord *D.* true "and faithful, and bear to you faith "for the lands and tenements which I "hold of you, and I will truly do and "perform the cuſtoms and ſervices that "I ought to do to you. So help me "God."

FEAST, or **Festival**, in a religious ſenſe, is a day of feaſting and thankſgiving.

Among the antients, feaſts were inſtituted upon various accounts, but eſpecially in memory of ſome favourable interpoſition of providence. Thus, the Jews had their feaſts of paſſover, pentecoſt, and tabernacles; the Greeks, their cerealia, panathenæa, *&c.* and the Romans, their ſaturnalia, ambarvalia, *&c.* See Passover, Cerealia, *&c.*

In the antient Chriſtian church, beſides the high feſtivals of Chriſtmas, Eaſter, Pentecoſt, Annunciation, *&c.* there were others inſtituted in honour of the apoſtles and martyrs: all which are retained by the church of England. See the articles Christmas, Easter, *&c.*

In the church of Rome, there are double, half-double, and ſimple feaſts almoſt without number. The name of double feaſts is given to ſuch whoſe ſervice is fuller and more ſolemn than the reſt, which likewiſe conſtitutes the difference between the others; the churches being embelliſhed, and the altars adorned, according to the rank which each ſaint holds in his reſpective church. All high feſtivals have an octave, conſiſting of the feaſt itſelf, and the ſeven following days.

In Italy, certain feſtivals are celebrated ſolely by the lovers of that country. When a lover wants to give his miſtreſs the higheſt teſtimony of his gallantry, he immediately makes her the idol of his devotion; procuring veſpers, and even maſſes, to be ſaid in her honour. For this purpoſe he makes choice of the feſtival of ſome ſaint whoſe name ſhe bears; and though the ſaint has the ſame name, they manage matters ſo, that the devotion of the feſtival is plainly relative to the lover's miſtreſs.

The four quarterly feaſts, or ſtated times, whereon rent on leaſes is uſually reſerved to be paid, are Lady-day, or the annunciation of the bleſſed virgin Mary, or 25th of March; the nativity of St. John the Baptiſt, held on the 24th of June; the feaſt of St. Michael the archangel, on the 29th of September; and Chriſtmas, or rather of St. Thomas the apoſtle, on the 21ſt of December. See the article Annunciation, *&c.*

FEATHER, in phyſiology, a general name for the covering of birds; it being common to all the animals of this claſs to have their whole body, or at leaſt the greateſt part of it, covered with feathers or plumage.

There are two ſorts of feathers found on birds, *viz.* the ſtrong and hard kind, called quills, found in the wings and tail; and the other plumage, or ſoft feathers, ſerving for the defence and ornament of the whole body. All birds, ſo far as yet known, moult the feathers of their whole body yearly.

Feathers make a conſiderable article of commerce, as ſerving for beds, writing-pens, *&c.* Thoſe for beds pay, on importation, 1l. 3s. 1$\frac{20}{100}$d; and draw back 1l. 0s. 3d. Oſtrich-feathers, if dreſſed, pay 7s. 8$\frac{40}{100}$d. the pound, but if undreſſed only 3s. 10$\frac{20}{100}$d; drawing back in the former caſe 6s. 9d. and in the latter, 3s. 4$\frac{1}{2}$d.

Feather-bed. See the article Bed.

Feather-beds, whether old or new, pay, on importation, each 10s. 3$\frac{20}{100}$d. and draw back 9s. on exporting them.

Feather, in the manage, a ſort of natural frizling of the hair, which in ſome parts riſes above the reſt, reſembling the tip of an ear of corn. This happens moſt frequently, between the eyes; and if lower, it is a ſign of a weak ſight.

A feather upon a horſe's neck, is called a roman feather; being a row of hair turned back, and forming a mark like a ſword-blade near the mane.

Mid-Feather, in the ſalt-works, the partition in the middle of the furnace, which it divides into two chambers. See the article Salt.

Feather-edged, among carpenters, an appellation given to planks or boards, which have one ſide thicker than the other.

Prince's Feather, a plant otherwiſe called amaranth. See the article Amaranth.

FEAZING in the ſea-language, ſignifies the ravelling out of any great rope, or cable, at the end.

FEBRIFUGE, in medicine, an appellation given to ſuch medicines as mitigate, or remove a fever. Theſe medicines are otherwiſe termed antifebrilia. Febrifuge is alſo a name for the centaurium minus.

FEBRIS, fever, in medicine. See the article Fever.

FEBRUARY, in chronology, the ſecond month of the year, reckoning from January, firſt added to the calendar of Romulus by Numa Pompilius.

February derived its name from Februa, a feaſt held by the Romans in this month, in behalf of the manes of the deceaſed, at which ceremony ſacrifices were performed, and the laſt offices were paid to the ſhades of the defunct.

February in a common year, conſiſts only of twenty eight-days, but in the biſſextile year, it has twenty-nine, on account of the intercallary day, added that year. See the article Bissextile.

FECIALES, or Foeciales, a college of prieſts inſtituted at Rome by Numa, conſiſting of twenty perſons, ſelected out of the beſt families. Their buſineſs was to be arbitrators of all matters relating to war and peace, and to be the guardians of the public faith. It is probable that they were ranked among the officers of religion, to procure them the more deference and authority, and to render their perſons more ſacred among the people. If the commonwealth had received any injury from a foreign ſtate, they immediately diſpatched theſe officers to demand ſatisfaction, who, if they could not procure it, were to atteſt the gods againſt the people and country, and to denounce war: otherwiſe they confirmed the alliance, or contracted a new one, which they ratified by ſacrificing a hog.

FECULA, or Fæcula, in pharmacy. See the article Fæcula.

FECULENT, or Fæculent, See the article Fæculent.

FECUNDITY, or Foecundity, the ſame with fertility. See Fertility.

FEE, in law, ſignifies a certain allowance to phyſicians, barriſters, attornies, and other officers, as a reward for their pains and labour.

If a perſon refuſe to pay an officer his due fees, the court will grant an attachment againſt him, to be committed till the fees are paid; and an attorney may bring an action of the caſe for his fees, againſt the client that retained him in his cauſe.

Fee alſo denotes a ſettled perquiſite of public officers, payable by thoſe who employ them.

The fees due to the officers of the cuſtom-houſe, are expreſly mentioned in a ſchedule, or table, which is hung up in public view in the ſaid office, and in all other places where the ſaid fees are to be paid or received. And, if any officer ſhall offend, by acting contrary to the regulations therein contained, he ſhall forfeit his office and place, and be for ever after incapable of any office in the cuſtom-houſe.

The other public offices have likewiſe their ſettled fees, for the ſeveral branches of buſineſs tranſacted in them.

Fee-estate, that held by the benefit of another, and for which ſome ſervice, rent, or acknowledgment is paid to the chief lord, or ſuperior, in whom the mere propriety of the ſoil always continues.

Fee is generally divided into abſolute and conditional. Abſolute, otherwiſe termed fee-ſimple, is where a perſon is ſeized of lands or tenements, to him and to his heirs for ever; whereas, fee-tail, or conditional fee, is where a perſon is ſeized of lands, with a limitation to him and the heirs of his body. A fee ſimple is the largeſt eſtate a perſon can have, and can be conveyed by no other expreſſion but heirs for ever; yet, in a will, which is more favoured than a grant, the intention of the teſtator is more conſidered than the literal meaning of the words. See the article Tail.

Fee-farm, a kind of tenure without homage, fealty or other ſervice, except that mentioned in the feoffment; which is uſually the full rent, or at leaſt a fourth part of it.

The nature of this tenure is, that if the rent be behind, and unpaid for two years, then the feoffor and his heirs may have an action for the recovery of the lands.

FEE EXPECTANT. See EXPECTANT.

FEELERS, in natural hiſtory, a name uſed by ſome for the horns of inſects.

FEELING, one of the five external ſenſes, by which we obtain the ideas of ſolid, hard, ſoft, rough, hot, cold, wet, dry, and other tangible qualities.

This ſenſe is the coarſeſt, but at the ſame time, the ſureſt of all others: it is beſides the moſt univerſal. We ſee and hear with ſmall portions of our body, but we feel with all. Nature has beſtowed that general ſenſation wherever there are nerves, and they are every where, where there is life. Were it otherwiſe, the parts diveſted of it might be deſtroyed without our knowledge. It ſeems that upon this account nature has provided, that this ſenſation ſhould not require a particular organization. The ſtructure of the nervous papillæ is not abſolutely neceſſary to it. The lips of a freſh wound, the perioſteum, and the tendons, when uncovered, are extremely ſenſible without them. Theſe nervous extremities ſerve only to the perfection of feeling, and to diverſify ſenſation.

Feeling is the baſis of all other ſenſations. All the nervous ſolids, while animated by their fluids, have this general ſenſation; but the papillæ in the ſkin, thoſe of the fingers in particular, have it in a more exquiſite degree, ſo perfectly, that they convey ſome notice of the figure of the bodies which they touch.

The object of feeling is every body that has conſiſtency or ſolidity enough to move the ſurface of our ſkin. It was neceſſary to perfect feeling, that the nerves ſhould form ſmall eminences, becauſe they are more eaſily moved by the impreſſion of bodies, than an uniform ſurface. It is, by means of this ſtructure, that we are enabled to diſtinguiſh not only the ſize and figure of bodies, their hardneſs and ſoftneſs, but alſo their heat and cold.

Feeling is ſo uſeful a ſenſation, that it ſupplies the office of the eyes, and in ſome ſenſe indemnifies us for their loſs.

FEELING *a horſe*, in the manege, is of two ſorts. 1. To feel a horſe in the hand, is to obſerve, that the horſe be under ſubjection, by obeying the bit. 2. To feel a horſe upon the haunches, is to obſerve, that he plies or bends them.

FEINT, in fencing, a ſhew of making a thruſt at one part, in order to deceive the enemy, that you may really ſtrike him in another.

A ſimple feint is a mere motion of the wriſt, without ſtirring the foot.

FELAPTON, in logic, one of the ſix moods of the third figure of ſyllogiſms, wherein the firſt propoſition is an univerſal negative, the ſecond an univerſal affirmative, and the third a particular negative.

FELIS, in zoology, is uſed by Linnæus, as the name of a large genus of quadrupeds, of the order of the feræ; the characters of which are theſe: the foreteeth are ſmall, obtuſe, and equal; the tongue is furniſhed with prickles, all pointing backwards; and the feet are formed for climbing, with claws which may be drawn in or exerted at the creature's pleaſure.

To this genus belong the lion, tiger, leopard, cat, cat of the mountain, lynx, and ounce. See LION, TIGER, *&c.*

FELIS VOLANS, the FLYING-CAT, an animal ſuppoſed to be the ſame with the flying ſquirrel. See SQUIRREL.

FELIS ZIBETHICUS, the CIVET-CAT. See the article ZIBETHICUM ANIMAL.

FELKIRK, a town of Auſtria, in Germany, thirty-five miles ſouth-eaſt of Conſtance.

FELLOWS, in fortification, are ſix pieces of wood, each whereof form a piece of an arch of ſixty degrees, and joined all together, by dulleges, make an intire circle; which with the addition of a nave, and twelve ſpokes, make the wheel of a gun carriage. Their thickneſs uſually is the diameter of the ball of the gun they ſerve for, and their breadth ſomething more.

FELLOWSHIP, or COMPANY, in arithmetic, is when two or more join their ſtocks, and trade together, dividing their gain, or loſs, proportionably.

Fellowſhip is either with or without time. Queſtions without time, or in the ſingle rule of fellowſhip, as it is frequently called, are wrought by the following proportion.

As the whole ſtock to the whole gain or loſs, ſo is each man's particular ſtock to his particular ſhare of gain or loſs.

Example I. A, B, and C make a joint ſtock: A puts in 460l. B 510l. and C 480l. they gain 340l. what part of it belongs to each?

In order to the ſolution of this queſtion, find the total of their joint ſtock, *viz.*

A's ſtock 460 l. + B's ſtock 510 l. + C's ſtock 480 l. = 1450 l. the total ſtock. Then 1. To find A's ſhare of the gain, ſtate as follows: If 1450l. : 340l. : : 460l. which being worked by the rule of three, the anſwer will be 107l. 17s. 2$\frac{3}{4}$d. for A's ſhare of the profit.

2. B's ſhare of the gain, by ſtating thus, if 1450 l. : 340l. : : 510l. and working by the rule of three, will be found to be 119 l. 11 s. 8$\frac{1}{2}$ d.

3. C's ſhare will appear 112l. 11s. 0$\frac{1}{4}$d. when worked as before, after having ſtated thus. If 1450l. : 340l. : : 480l.

Ex. II. Suppoſe three partners, A, B, and C make a joint ſtock in this manner: A puts in 24l. B 32l. and C 40l. in all 96l. with which they trade, and gain 12 l. required each man's true ſhare of that gain? The firſt operation for A's part of the gain will ſtand thus,

96l : 12l : : 24l : 3l = A's gain.
96l : 12l : : 32l : 4l = B's gain.
96l : 12l : : 40l : 5l = C's gain.

Proof 3l.+4l.+5l.=12l. the whole gain. That is, if the total of all their particular gains amounts to the whole gain, the work is true; if not, ſome miſtake has been committed.

FELLOWSHIP *with time*, uſually called the *Double Rule of Fellowſhip*, becauſe every man's money is to be conſidered with relation to the time of its continuance in the joint ſtock. It is worked thus, multiply each man's ſtock by the reſpective time he puts it in for, and add all the products; the total of which muſt be your firſt number through all the ſtatings: the gain or loſs the ſecond, as before; and each man's particular ſtock, multiplied by its time, the third.

Note, all the particular times (if not ſo given) muſt be reduced into one denomination, *i. e.* all years, all months, all weeks, or all days, &c. See REDUCTION.

Ex. I. A put into company 560l. for eight months, B 279l. for ten months, and C 735l. for ſix months; they gained 1000l. What ſhare of it muſt each have? For the ſolution of this queſtion, proceed as follows. A's ſtock 560l. × 8 its time = 4480, B's ſtock 279l. × 10 its time = 2790, C's ſtock 735l. × 6 its time = 4410. Then 4480 + 2790 + 4410 = 11680. Now 1. To find A's ſhare of the profit, ſtate thus. If 11680l. : 1000l. : : 4480l. which being worked by the rule of three, the anſwer will be 383l. 11s. 2$\frac{3}{4}$d. for A's ſhare of the gain.

2. For finding B's ſhare, ſtate thus, if 11680l. : 1000l. : 2790l. and working as before directed, the anſwer will be 238l. 17s. 4$\frac{3}{4}$d.

3. To find C's proportion of the gain, ſay, if 11680l. : 1000l : : 4410l. then working it by the rule of three, the true amount of his ſhare will appear to be 377l. 11s. 4$\frac{1}{4}$d.

Ex. II. Three merchants, A, B, and C, enter into partnerſhip thus; A puts into the ſtock 65l. for eight months; B puts in 78l. for twelve months; and C puts in 84l. for ſix months. With this joint ſtock they traffic, and gain 166l. 12s. 'Tis required to find each man's ſhare of the gain proportionable to his ſtock and time of employing it.

1. A's ſtock 65l. × 8 months, the time it was employed = 520
2. B's ſtock 78l. × 12 months, the time it was employed = 936
3. C's ſtock 84l. × 6 months, the time it was employed = 504
The ſum of all thoſe products is 1960

Then, as before, the ſeveral proportions will ſtand thus:

1960 : 166,6 : : 520 : 44, 2 = 44l. 4s. for A's ſhare.
1960 : 166,6 : : 936 : 79,56 = 79l. 11s. 2$\frac{1}{2}$d. for B's ſhare.
1960 : 166,6 : : 504 : 42,84 = 42l. 16s. 9$\frac{1}{2}$d. for C's ſhare.
The whole gain = 166l. 12s.

FELO DE SE, in law, a perſon that deliberately lays violent hands on himſelf, and is the occaſion of his untimely death, whether by hanging, drowning, ſtabbing, ſhooting, or any other way.

It is a ſpecies of felony, of which infants, ideots, lunatics, and perſons diſtracted by a diſeaſe, cannot be guilty, it being the willful and deliberate perpetration of ſelf-murder, that conſtitutes this crime.

The goods and chattels, both real and perſonal, of a felo de ſe, are forfeited to the king: however, the jury frequently ſave the forfeiture, by finding their verdict lunacy; to which they are inclined, on a favourable interpretation, that it is impoſſible for a perſon in his ſenſes to do a thing ſo contrary to nature.

FELON, in law, a perſon guilty of felony. See the article FELONY.

Felon-wort, in botany, the ſame with the ſolanum, or deadly nightſhade.

FELONY, in law, a capital crime, next in degree to petit treaſon, and committed with an evil intention; ſuch are murder, theſt, ſuicide, ſodomy, rape, *&c.* See the articles Murder, Theft, *&c.*

Felony is either by the common law, the civil law, or by ſtatute.

Felony at common law is either againſt the life of a perſon, as murder, manſlaughter, felo de ſe, and ſe defendendo; againſt his goods, as larceny, and robbery; againſt his habitation, as burglary, arſon, and houſe-breaking; or, laſtly, againſt public juſtice, by breach of priſon, reſcue, and eſcape, *&c.*

Piracy, and robbery and murder on the ſea, is felony both by the civil-law, and by ſtatute. See the articles Murder, Burglary, Robbery, *&c.*

There are uſually reckoned two ſorts of felony, one lighter, and ſuch as for the firſt offence may be allowed benefit of clergy; which the other, or greater may not. See the article Clergy.

Felony is puniſhable with loſs of life and of lands not intailed, alſo of goods and chattels. It alſo corrupts blood, unleſs the ſtatute, making an offence to be felony, ordains it ſhall be otherwiſe, as ſome ſtatutes do.

FELT, in commerce, a ſort of ſtuff, deriving all its conſiſtence merely from being fulled, or wrought with lees and ſize, without either ſpinning or weaving.

Felt is made either of wool alone, or of wool and hair. Thoſe of french make, $3\frac{1}{2}$ yards long, and $1\frac{1}{2}$ broad, for cloaks, pay each 2 l. 14 s. $1\frac{80}{100}$ d. on importation, and draw back 1 l. 12 s. 3 d. on exporting them again.

FELTRI, a town of Italy, ſubject to Venice, thirty-five miles north of Padua.

FELUCCA, in ſea-affairs, a little veſſel with ſix oars, frequent in the Mediterranean, which has this peculiarity, that its helm may be applied either in the head or ſtern, as occaſion requires.

FEMALE, *fœmina*, a term peculiar to animals, ſignifying that ſex which conceives and generates its young within itſelf. See Sex and Generation.

Females differ in many reſpects, beſides ſex, from males: in moſt quadrupeds they are ſmaller and weaker; but, in birds of prey, the reverſe of this generally holds. See the article Male.

Female is alſo applied, figuratively, to things without life, from the reſemblance they bear to the females of animals: thus we ſay, a female ſcrew, female flower, *&c.* See Screw, Flower, *&c.*

FEMME covert, in law, a married woman. See the article Coverture.

Femme sole, an unmarried woman, whoſe debts, contracted before marriage, become thoſe of her huſband after it.

A femme ſole merchant, is where a woman, in London, uſes a trade alone, without her huſband, on which account ſhe ſhall be charged without him.

FEMININE, or **Foeminine**, in grammar, one of the genders of nouns. See the article Gender.

The feminine gender ſerves to intimate that the noun belongs to the female. In latin, the feminine gender is moſt commonly diſtinguiſhed by the article *hæc*, as it is in the greek by the article ἡ. In the french the article *la* commonly denotes this gender; but we have no ſuch diſtinction by articles in the engliſh language.

FEMUR, *os femoris*, in anatomy, the thigh-bone.

This is the longeſt and ſtrongeſt bone in the whole human frame. In its upper extremity is to be obſerved a very large head, and in this head a cavity deſtined for the ligamentum rotundum, by means of which it is fixed in the acetabulum, and its luxation upwards prevented. To its neck is affixed a robuſt annular ligament, which contains the head and neck of the bone as it were in a caſe: it is obſervable, that the progreſs of this neck is not ſtraight but oblique, nearly horizontal, and turning ſomewhat outward, being the contrivance of nature for keeping the thighs aſunder, by which means we tread the firmer; and, by this ſituation of the neck of this bone alſo, ſeveral muſcles have a much more commodious inſertion than could otherwiſe have been poſſible. Next, may be remarked the ſpongy cavernous ſtructure of this extremity of the bone, by reaſon of which it is leſs liable to fractures, eſpecially in this part: the apertures for the ingreſs of ſeveral veſſels are alſo obſervable; and there are two apophyſes, called trochanters, which ſerve for the inſertion of the muſcles of the thigh, and which, together with the head, become, before puberty, diſtinct epiphyſes. In the lower extremity of the femur we obſerve two heads, with a cavity between them, for the articulation with the tibia; alſo a poſterior cavity intended to give ſafe paſſage to the veſſels of the tibia: there is, beſides, an interior cavity, for the placing of the patella: and laſtly, two condyles, or tubercles, placed near the heads, and ſerving for a fixed point to the origin of the muſcles, which are to move the foot. In the exterior part of theſe we obſerve a peculiar depreſſion, and often a ſingle ſeſamoide bone; and ſometimes there is alſo found another of theſe in the other tubercle: this uſually, however, happens in old ſubjects. The whole extremity of the femur, is ſeen, quite to the age of puberty, a perfectly diſtinct epiphyſis. In the body of the thigh-bone it is remarked that the anterior ſurface is convex, but the poſterior ſomewhat concave: the obliquity of this part of the body is ſingular: its ſpine is remarkable, as is alſo its great cavity for containing the marrow. The ſtrength and firmneſs of this bone are ſurpriſingly great; hence the uſe of the thigh-bone is to ſupport and ſuſtain the weight of the whole body, and its moveable articulation at the head gives way to the eaſy motion of the body, while the feet are unmoved.

For fractures and luxations of the femur or the thigh-bone, ſee the article THIGH.

FEN, a place overflowed with water, or abounding with bogs, See the articles BOG and DRAINING.

Fens are either made up of a congeries of bogs, or conſiſt of a multitude of pools or lakes with dry ſpots of land intermixed, like ſo many little iſlands.

Several ſtatutes have been made for the draining of fens, chiefly in Kent, Cambridgeſhire, Bedfordſhire, and Lincolnſhire; and by a late act, 11 Geo. II. commiſſioners ſhall be appointed for the effectually draining and preſerving of the fens in the iſle of Ely, who are authorized to make drains, dams, and proper works thereon; and they may charge the landholders therein with a yearly acre-tax, and in default of payment ſell the defaulter's lands.

FENCE, in country-affairs, a hedge, wall, ditch, bank, or other incloſure, made around gardens, woods, corn-fields, &c. The chief reaſon why woodlands and plantations ſo ſeldom proſper, is in a great meaſure owing to the neglect of fencing them round, to keep out the cattle. This neglect prevails much in the northern parts of this iſland, though the uſe of fences is certainly more neceſſary there than in the ſouth, as the lands require more ſhelter and warmth. There are ſeveral ways of fencing lands, but the uſual is that of hedging it with either white or black thorn, crab, holly, alder, or furze, &c. See HEDGE. But the beſt, and probably the cheapeſt, conſidering the duration and goodneſs of it, where flat ſtones are not to be had, is, in a graſſy place, to dig turf, a ſpit or near a ſpit deep, the breadth of your ſpade, and about four or five inches thick: lay theſe turf with the graſs outward, even by a line on one ſide, and on the backſide of theſe lay another row of turf, leaving a foot ſpace of ſolid ground on the outſide, to prevent the bank from ſlipping in, if the ground ſhould any way be faulty: on the outſide of which you may make a ditch of what breadth or depth you pleaſe; or you may lower the ground on each ſide with a ſmall ſlope, two feet deep, by which means you will have no loſs of paſture by the fence, becauſe it will bear graſs on both ſides. Then, with the earth that comes out of the ditches or ſloped places, fill the middle of the bank level with the turf on each ſide, and then lay two more rows of turf upon the firſt, and then fill it again as before: this do, till your bank be four feet high, or of what height you pleaſe, only your foundation muſt be always broader the higher you raiſe it. You muſt obſerve on each ſide to give a ſmall ſlope to the bank, ſo as to make the top about three feet wide, upon which plant quick, making on the top a little hollow, to keep as much of the rain to the quick as you can. Be ſure to plant the quick about a foot or more in depth, by which means you will have a fence ſix feet high, beſides the hedge on it, which will, in a very dry time, be always green on both ſides, like a green wall, make a pleaſant fence, and keep all ſorts of cattle within their bounds.

In Devonſhire they build two ſtone walls, firſt ſetting two edgeways, and then one between, and as it riſes filling the interval or coffer with earth, to any height and breadth at pleaſure. This is the neateſt and moſt ſaving fence whatever, where they can be ſupplied with abundance of flatty ſtones. Upon theſe banks they not only plant quick-ſets, but timber trees that thrive exceedingly.

In Cornwal the huſbandmen ſecure their woods and lands with high mounds, on which they plant acorns, ſo that the roots of their ſprouts bind in the leſſer mould, and form a double and durable fence.

FENCE-MONTH, the month wherein deer begin to fawn, during which it is unlawful to hunt in the foreſt.

It commences fifteen days before midſummer,

ſummer, and ends fifteen days after it. This month, by antient foreſters, is called defence-month. There are alſo certain fence-months, or ſeaſons, for fiſh as well as wild beaſts, as appears by ſtat. Weſt. 13 Geo. II.

FENCING, the art of making a proper uſe of the ſword, as well for attacking an enemy, as for defending one's ſelf.

Fencing is a genteel exerciſe, of which no gentleman ought to be ignorant. It is learned by practiſing with foils, called in latin *rudes*.

According to Pyrard, fencing is in ſo high repute in the Eaſt-Indies, that the greateſt noblemen and even princes teach it.

Fencing is either ſimple or compound.

Simple is that performed nimbly and off hand, on the ſame line. In this the principal intention, in reſpect to the offenſive part, ſhould be to attack the enemy in the moſt unguarded part; and in the defenſive, to parry or ward off the enemy's thruſts and blows. See the articles GUARD, PARRYING, *&c.*

Compound fencing, on the offenſive part, includes all manner of arts to deceive the enemy, by making him leave the part unguarded which we want to attack; ſuch are feints, appeals, claſhing and intangling of ſwords, half-thruſts, *&c.* And on the defenſive, to parry and thruſt at the ſame time.

An appeal is a ſimple thruſt, made by beating with the right foot in the ſame place.

FEND, in the ſea-language, imports the ſame as defend: thus, fending the boat, is ſaving it from being daſhed to pieces againſt the rocks, ſhore, ſhip's ſides. And hence

FENDERS are pieces of old hawſers, cable-ropes, or billets of wood, hung over the ſhip's ſides, to keep other ſhips from rubbing againſt and injuring her.

FENDER-BOLTS, or FEND-BOLTS. See the article BOLT.

FENDUE *en pal*, in heraldry, a croſs clove down in pale, that is, from top to bottom, and the two parts ſet at ſome diſtance from each other.

FENESTRA, in anatomy, a term applied to two openings or foramina within the ear, diſtinguiſhed by the names of the oval and the round feneſtra. The feneſtra ovalis leads to the veſtibule on which ſtands the ſtapes. The feneſtra rotunda leads to the cochlea, and is cloſed by a membrane. See the articles EAR, STAPES, COCHLEA, *&c.*

FENESTRELLES, a town and fort of Piedmont, fifteen miles from Turin.

FENNEL, *fœniculum*, in botany. See the article FOENICULUM.

There are kept two very different ſorts of fennel-ſeeds in the ſhops, called the common fennel-ſeed and the ſweet fennel-ſeed. The common kind is of a ſharp, biting, and pungent taſte; whereas the ſweet kind is not only larger and more beautiful, but of a pleaſant aromatic ſweetiſh taſte, with nothing of the pungency of the other. Sweet fennel-ſeed is accounted carminative and attenuant, and conſiderably diuretic and ſudorific, and recommended as a ſpecific in the meaſles, ſmall-pox, and malignant fevers. It is alſo an ingredient in many of the officinal compoſitions, and in the decoctions for clyſters.

Fennel-roots are of the number of the five opening ones of the ſhops, and preſcribed in the ſame intentions with the ſeeds. They are likewiſe ſaid to be great antinephritics.

FENNEL-FLOWER, a plant known among botaniſts by the name of nigella. See the article NIGELLA.

FENNEL-GIANT, a plant alſo called ferula. See the article FERULA.

Hog's FENNEL, the engliſh name of the peucedanum. See PEUCEDANUM.

Scorching FENNEL, a name given to the thapſia. See the article THAPSIA.

FENUGREEK, or FOENUGREEK. See the article FOENUGREEK.

FEOD, *feodum*, the ſame with fee. See FEE.

FEODAL and FEODATORY. See the articles FEUDAL and FEUDATORY.

FEOFFMENT, in law, is a gift or grant of any manors, meſſuages, lands, or tenements to another in fee, that is, to him and his heirs for ever, by delivery of ſeiſin, and poſſeſſion of the eſtate granted.

A deed of feoffment is the moſt antient conveyance of lands, and is ſaid in ſome meaſure to exceed the conveyance by fine and recovery, becauſe it clears all diſſeiſins, abatements, intruſions, and other wrongful eſtates, which neither a fine, recovery, nor bargain and ſale by deed indented and inrolled, does. It alſo bars the feoffer from all collateral benefit, in reſpect to conditions, powers of revocation, writs of error, *&c.* and deſtroys contingent uſes. A feoffment however muſt not be made of ſuch things, whereof livery and ſeiſin may not be made; for no deed of feoffment is good to paſs an eſtate, without livery of ſeiſin: ſo that if either of the parties die before livery, the feoffment becomes void. Nevertheleſs a freehold may be granted without livery, on the ſtatute of 27 Hen. VIII. by virtue of which a feoffment to the uſe of the feoffer or feoffee, ſupplies the place of livery and ſeiſin.

A deed of feoffment is always applied to ſome corporeal and immoveable thing, and uſually conſiſts of the following parts, *viz.* the names and additions of the parties, the conſideration, the granting part, the thing granted, the habendum or clauſe explaining for what eſtate or uſe it is granted, a covenant that the feoffer is ſeiſed in fee and has good right to grant, that the feoffee ſhall quietly enjoy the premiſes free from incumbrances; and, laſtly, a covenant for making further aſſurance with a letter or power of attorney to make livery and ſeiſin.

FERÆ, in zoology, an order of quadrupeds, the diſtinguiſhing characters of which are, that all the animals belonging to it have ſix fore teeth in each jaw, and the canine or dog-teeth conſiderably long.

Under this order are comprehended ſeveral large genera, as the urſus, felis, muſtela, lutra, canis, phoca, meles, erinaceus, daſypus, talpa, and veſpertilio. See the articles URSUS, FELIS, &c.

FERÆ NATURÆ, in law, ſignifies beaſts and birds that are wild, as foxes, hares, wild-ducks, &c. in which no perſon can claim any property.

FERABATH, a port town of Perſia, ſituated on the ſouth coaſt of the Caſpian ſea: eaſt lon. 50°, and north lat. 38°.

FERALIA, in antiquity, a feſtival obſerved among the Romans, on Feb. 21, or, according to Ovid, on the 17th of that month, in honour of the manes of their deceaſed friends and relations. During the ceremony, which conſiſted in making preſents at their graves, marriages were forbidden, and the temples of the divinities ſhut up; becauſe they fancied that during this feſtival, the ghoſts ſuffered no pains in hell, but were permitted to wander about their graves, and feaſt upon the meats prepared for them.

FER DE FOURCHETTE, in heraldry, a croſs having at each end a forked iron, like that formerly uſed by ſoldiers to reſt their muſquets on. It differs from the croſs fourcheé, the ends of which turn forked, whereas this has that ſort of fork fixed upon the ſquare end. See plate XCVI. fig. 2.

FER DE MOULIN, *milrinde*, *inke de moulin*, in heraldry, is a bearing ſuppoſed to repreſent the iron-ink or ink of a mill, which ſuſtains the moving mill-ſtone.

FERDEN, or VERDEN, a city of Germany, ſubject to Hanover; it is ſituated in lower Saxony, on the river Aller, twenty-ſix miles ſouth-eaſt of Bremen: eaſt lon. 9°, and north lat. 53° 24′.

FERDWIT, a term formerly uſed to denote a freedom from going forth upon any military expedition; or, according to ſome, the being quit of manſlaughter committed in the army.

FERE, a town of Picardy, in France, forty-two miles ſouth-eaſt of Amiens.

FERENTARII, in roman antiquity, were auxiliary troops, lightly armed; their weapons being a ſword, bow, arrows, and a ſling.

There were another kind of ferentarii, who carried arms after the armies, and were ready to ſupply the ſoldiers in time of battle.

FERETINO, a city and biſhop's ſee of Italy, about fifty miles eaſt of Rome: eaſt lon. 14° 5′, and north lat. 41° 45′.

FERIÆ, in roman antiquity, holidays, or days upon which they abſtained from work.

It was a pollution of the feriæ, according to Macrobius, if the rex ſacrorum or flamines ſaw any work done on them, and therefore they ordered proclamation to be made by the herald, that every one might abſtain from work, and whoever tranſgreſſed the order, was fined. Nay, the ſame author informs us, that Mutius Scævola, the pontiff, was of opinion, that the breaking the feriæ was an unpardonable crime, unleſs it was done inadvertently, and in this caſe an expiation was to be made by ſacrificing a hog.

The Romans had two kinds of feriæ: 1. The public, common to all the people in general. 2. The private, which were only kept by ſome private families.

The public feriæ were four-fold: 1. Stativæ feriæ, holidays which always fell out upon the ſame day of the month, and were marked in the calendar; of theſe the chief were the agonalia, carmentalia, and lupercalia. See the articles AGONALIA, CARMENTALIA, &c. 2. Conceptivæ feriæ, holidays appointed every year upon certain or uncertain days by the magiſtrates, or the pontiff; ſuch were the latinæ, paganalia, compitalia, &c. See the article PAGANALIA, &c. 3. Imperativæ feriæ, holidays commanded or appointed by the authority of the conſuls or prætors; of this kind we may reckon the lectiſternium. See LECTISTERNIUM. 4. Nundinæ, the days for fairs. See NUNDINÆ.

The private feriæ were either confined to private families or particular perſons, as birth-days; and thoſe expiations upon the tenth day after a perſon died in a houſe, called feriæ denicales.

FERIÆ LATINÆ were inſtituted by Tarquinius Superbus, who having overcome the Tuſcans, made a league with the Latins, and propoſed to them to build a temple in common to Jupiter Latialis, in which both nations might meet, and offer ſacrifice for their common ſafety. At this feſtival a white bull was ſacrificed, and each town, both of the Latins and Romans, provided a certain quantity of meat, wine, and fruits. At firſt the ſolemnity continued but one day; after the expulſion of the kings, the ſenate added a third, a fourth, and ſo on to ten days.

FERIA, in the romiſh breviary, is applied to the ſeveral days of the week; thus Monday is the feria ſecunda, Tueſday the feria tertia; though theſe days are not working days, but holidays. The occaſion of this was, that the firſt chriſtians were uſed to keep the eaſter week holy, calling Sunday the prima feria, &c. whence the term feria was given to the days of every week. But beſides theſe, they have extraordinary feriæ, *viz.* the three laſt days of paſſion-week, the two days following eaſter-day, and the ſecond feriæ of rogation.

FERIAL DAYS, according to the ſtatute 27 Hen. VI. cap. v. are taken for all days of the week except Sunday.

FERMANAGH, a county of Ireland, in the province of Ulſter, the chief town of which is Inniſkilling.

FERMENT, any body which being applied to another, produces fermentation. See the article FERMENTATION.

Ferments are either matters already in the act of fermentation, or that ſoon run into this act. Of the firſt kind are the flowers of wine, yeaſt, fermenting beer, or fermenting wine, &c. and of the ſecond are the new expreſſed vegetable juices of ſummer-fruits.

Among diſtillers, ferments are all thoſe bodies, which, when added to the liquor, only correct ſome fault therein, and by removing ſome obſtacle to fermentation, forward it by ſecondary means; as alſo ſuch as being added in time of fermentation, make the liquor yield a larger proportion of ſpirit, and give it a finer flavour. See the article ADDITION.

It appears that ferments are of uſe not only in beginning, but in regulating and determining the ſpecies of fermentation: thus freſh yeaſt determines the fermentation of wheat flour, to make our common bread, which would prove of another kind with the flowers or lees of vinegar; and thus ſpecific or determinate ferments have their correſpondent effects. If ſugar, honey, manna, treacle, or new wine be added to vinegar, themſelves are ſoon changed into vinegar without ſtoping to make wine; becauſe the acetous ferment or vinegar over-rules them; and ſo vinegar is ſooneſt made in a caſk that has before contained the ſame liquor. And if the beſt wine were put into a caſk that had held putrified vinegar, the wine would not now make vinegar, but immediately run into corruption. So great and over-ruling a power have ſpecific ferments; the uſe of which may afford conſiderable rules in chemiſtry, practical philoſophy, and arts.

We recommend, therefore, to diſtillers to be careful in pitching upon a proper ferment, and alſo to conſider its quantity, quality, and manner of operation. The quantity muſt be proportioned to that of the liquor, to its tenacity, and the degree of flavour it is intended to give, and to the diſpatch required in the operation. As to the quality, it muſt be choſen perfectly ſweet and freſh, for all ferments are liable to grow muſty and corrupt; and if in this ſtate they are mixed with the fermentable liquor, they will communicate their nauſeous and filthy flavour to the ſpirit, which will ſcarce ever be got off by any ſubſequent refining. If the ferment be ſour, it muſt by no means be uſed to any liquor; for it will give it an acetous inſtead of a vinous tendency. The ferment is to be put to the fermentable liquor in a ſtate barely tepid, or ſcarce lukewarm. For the ferments moſt generally uſed, ſee the articles LEES *of wine*, YEST, &c.

FERMENTARIANS, *fermentarii*, an appellation which thoſe of the latin church have given to the Greeks, on account of their uſing leavened or fermented bread in the euchariſt. The greek church, on the other hand, call the Latins azymites. See the article AZYMITES.

FERMENTATION, may be defined a

ſenſible internal motion of the conſtituent particles of a moiſt, fluid, mixt or compound body; by the continuance of which motion, theſe particles are gradually removed from their former ſituation or combination, and again, after ſome viſible ſeparation is made, joined together in a different order and arrangement. The whole proceſs then of fermentation, conſiſts of two different operations, *viz.* an analytical one, whereby the particles are reſolved; and a ſynthetical one, whereby they are new ranged. And whenever theſe two different effects are found to be produced in direct ſequence, the operation may be called by the name of fermentation, whether it happen in the blood or other animal, vegetable, or mineral ſubſtances. All ſeparable, mixt, or compound bodies, may be the ſubject of this operation; but the eaſier they are ſeparable by means of water, air, and heat, the more readily they ferment. Thus the ſweet or ſaccharine part of malt more readily diſſolving in warm water, ferments eaſier than unmalted corn, which is more clammy, and will not diſſolve ſo ſoon.

Fermentation, according to our later philoſophers, ariſes from an inequality in the attractions of coheſion of the conſtituent particles of bodies. They diſtinguiſh it into two kinds, the one is that which happens when a ſolid is diſſolved by a fluid; the other is, when two fluids being mixed together, ferment with each other. Dr. Friend and Keill are of opinion, that in order to cauſe a fermentation between a ſolid and a fluid, it is neceſſary, 1. That the particles of the ſolid attract thoſe of the fluid with a greater force, than the particles of the fluid attract one another. 2. That the pores of the ſolid be not too ſmall to admit the particles of the fluid into them. 3. That the body be of ſo looſe a contexture, that the force of impact, with which the particles of the fluid ruſh into its pores, may be ſufficient to diſunite its parts. 4. That the elaſticity of the particles tend to promote and augment the fermentation. Dr. Boerhaave makes alſo four conditions requiſite, 1. That there be a due proportion between the ſize of the particles of the fluid, and the pores of the body to be diſſolved. 2. That the figure of the particles of the fluid, have a determinate relation to that of the pores of the ſolid. 3. That the particles of the fluid be ſufficiently ſolid, that their momentum or force of action may not be too weak. 4. That there be a fit diſpoſition of the particles of the fluid, when received into the pores of the ſolid, to make ſome ſtay there and not immediately to paſs through, but to act every way upon the ſolid, as they move towards the external ſurface thereof. Mr. Rowning thinks there is no occaſion to have recourſe to ſo many ſuppoſitions: if the particles of the ſolid (ſays he) attract thoſe of the fluid with a greater degree of force than either thoſe of the fluid or thoſe of the ſolid attract one another, it is ſufficient, and there will follow a diſſolution of the body, as may clearly be demonſtrated from the laws of mechanics, whatever the other circumſtances relating to the figure or magnitude of pores, *&c.* may be. See Rown. Syſt. of Nat. Phil. part II. Diſſ. VIII.

Fermentation is divided by chemiſts into many diſtinct ſpecies, particularly into vegetable, animal, and mineral. The vegetable kind again may be diſtinguiſhed into vinous, acetous, and putrefactive; the vinous again into mucilaginous, mouldy, and putrefactive, and ſo of the acetous.

Of vinous FERMENTATION. The juice of the grape being chemically examined, proves to be no more than a large proportion of real ſugar diſſolved in water, with the addition only of a certain flavour in the juice of the grape, according to the nature of the vine; whence we may lay it down as an axiom, that a ſaccharine ſubſtance is the baſis of wines; and indeed whoever would thoroughly enquire into the nature and means of improving vinous and acetous fermentation, cannot perhaps do better than to chooſe ſugar for his ſubject; a chemical analyſis of which will ſhew the principles neceſſarily required in this operation. Theſe principles appear to be an acid ſalt, an oil and earth ſo united together, as to be capable of diſſolving perfectly in water. Experience ſhews us, that all fermentable bodies do not require ferments to begin their motion of fermentation. Raiſins we know, require none, much leſs does the freſh expreſſed juice of the grape, or other vegetable juices in the ſummer ſeaſon, or in a warm air. But all ſweet vegetable juices that have felt much of the fire, as treacle, wort high boiled, rob of malt, rob of elder, or the like, uſually require a conſiderable proportion of vinous ferments to make them work. Water, we find is abſolutely neceſſary to begin and procure a fermentative motion in vegetable ſubſtances; for raiſins and ſugar being kept dry, will never ferment: and this holds univerſally of all the ſubjects of vinous and acetous fermentation. Whence water is an inſtrument that muſt be neceſſarily employed in theſe kinds of fermentation, whether natural or artificial. Warmth, with the free admiſſion of the external air, is neceſſary to expedite the actions of vinous fermentation; for if raiſins and water were to ſtand either in a very cold place, or be kept entirely from the acceſs of the common atmoſpherical air, either no fermentation, or a very ſlow and ſmall one, would enſue, as has been often experienced. The lees remaining at the bottom of a caſk where wine has fermented, will ſet any leſs fermentable ſubject at work, and determine its fermentation for the vinous kind. Whence it appears that vinous fermentation conſiſts, firſt, in an inteſtine ſtruggle or commotion of the fluid; and, ſecondly, in a ſeparation of a groſſer part, which did not appear in that form before.

Of acetous FERMENTATION. The whole proceſs of making vinegar being attentively conſidered, it is obſervable, that if wine were not bunged down when arrived at its vinous ſtate, but ſuffered ſtill to remain open and expoſed to a warm air, it would ſpontaneouſly become vinegar; and the ſooner, if a ſomewhat greater degree of heat than ſerved for the making of wine, were employed. Acetous fermentation then requires a ſtronger heat than the vinous; and wines having once finiſhed their fermentation, as wines, do not naturally ſtop there, but unleſs prevented, proceed directly on to vinegars; where again they make no ſtop, but unleſs prevented here alſo, ſpontaneouſly go on to vapidity, ropineſs, mouldineſs, and putrefaction: from which obſervation we would deduce this axiom, that, to ſpeak philoſophically, the intention and tendency of nature is to proceed from the very beginning of vinous fermentation directly in a continued ſeries to putrefaction, and thence again to a new generation. See PUTREFACTION, *&c.*

If we examine the changes wrought upon vegetable ſubjects by vinous and acetous fermentation, we ſhall find that an inflammable ſpirit is produced by the action of vinous fermentation, from a vegetable ſubject and water, wherein no ſigns of any ſuch ſpirit appeared before; inſomuch, that this may be juſtly eſteemed the criterion or inſeparable effect of vinous fermentation; but that acetous fermentation, on the other hand, has a very different effect, and that it either conceals, alters, exhales, deſtroys, or ſome ways aboliſhes the inflammable ſpirit produced by the vinous fermentation. A part of this ſpirit is unqueſtionably exhaled by the heat employed in acetification, yet part alſo remains behind under a different modification, ſo as to be recovered by art in an inflammable form, as we find by diſtilling the ſugar of lead, which is only lead diſſolved in ſpirit of vinegar. Having thus a criterion of acetous fermentation, as before we had of the vinous, (for if an acid uninflammable liquor comes firſt by diſtillation over from a vegetable ſubject after fermentation, this will determine that fermentation to have been of the acetous kind) we are plainly led to allow of two very different kinds of fermentation in the ſame vegetable ſubject, and we make no doubt that ſome other ſpecies may be found upon due enquiry.

It has been diſputed, whether animal bodies naturally undergo a fermentation after death; but ſuppoſing this not a diſpute about words, it ſhould ſeem that there is a proper ſpecies of fermentation peculiar to the animal ſubjects, as there is one peculiar to vegetables: and till this point be ſettled, we ſhould not lay down vegetable fermentation as the teſt and ſtandard of fermentation in general. For want of diſtinguiſhing in this caſe, all true fermentation ſeems denied to the blood and juices circulating in a living animal body, and, again, to the ſap of vegetables. But perhaps, were the enquiry into fermentation proſecuted in its full latitude, and not arbitrarily confined to any ſingle ſpecies, many natural and artificial operations would prove to be actual fermentation. To ſay that there is no fermentation in the blood, becauſe it affords no inflammable ſpirit upon diſtillation, is to ſay, in effect, that blood is not wine; whereas the queſtion is not whether there be a vegetable fermentation in the blood, but whether there be not an animal one; the criterion of which is the production of a volatile urinous ſalt, as the production of an inflammable ſpirit is the criterion of vinous fermentation. Some of the proceſſes in chemiſtry ſeem to prove, that fermentation is not confined

fined to animal and vegetable ſubſtances, but that minerals are alſo liable to ſomething of it. If an ounce of lead, and an ounce of biſmuth be melted together in an iron ladle, and an ounce of quickſilver be heated in another ladle, and all three mixed together, this makes an amalgama, which appears perfectly uniform or homogeneous, and paſſes through leather in a running form. But this mixture being ſuffered to cool and ſtand quiet for ſome hours, a groſs matter will ſeparate from it by degrees, and float upon the reſt, which will now run eaſily through leather, and leave the groſs metallic matter behind. Here then appears all the requiſites of fermentation, a fluid form, an uniform matter, an inteſtine motion, and an actual ſeparation of a groſſer matter, leaving a thinner behind. There are many more inſtances of an apparent fermentation in mineral bodies; but this ſuffices to evince, that in a proper ſenſe, there is an actual fermentation exerciſed not only in the vegetable and animal, but alſo in the mineral kingdom.

Upon the whole we may infer, 1. That the degrees of fermentation differ with the degrees of heat employed: thus vinous fermentation requires a leſs degree of heat than the acetous, the acetous leſs than the putrefactive, which laſt may conſiſt with a degree of ignition. 2. That a particular kind of fermentation may be carried on in the bodies of living animals and vegetables, which are largely ſupplied with the requiſite inſtruments of fermentation, *viz*, water, air, and heat; and in fact both animals and vegetables appear to have an inteſtine motion in all their circulating fluids, which continually depoſite a groſſer matter in the canals and parts they move through. 3. That when vegetables and animals die, there ſoon begins a different kind of fermentation in all their parts, tending not now to the repair, but to the entire deſtruction of their organical veſſels. 4. That dry or ſolid ſubſtances, cannot in that ſtate undergo a proper fermentation; for tho' they may in that ſtate be ſeparated into minute particles, yet they cannot range themſelves together in any order, nor depoſite a groſſer matter without being agitated by ſome fluid, or, for ſome time, ſuſpended therein.

We obſerved before, that heat, with a free admiſſion and emiſſion of the common air, were neceſſary to promote fermentation; the things which check or hinder it, are theſe: 1. The acid fume of burning ſulphur, received in a large quantity at ſeveral times, and ſhut up along with the air, remaining on the top of the fermenting liquor. 2. Alkaline ſalts, if added in a large quantity to fermenting liquors, immediately excite a greater efferveſcence, which preſently ceaſing, all farther fermentation is ſtopped. But, in both theſe caſes, the fermenting liquor is ſpoiled. 3. The ſtopping up of the containing veſſel ſo cloſe, that nothing may eſcape or enter, provided the veſſel be ſo ſtrong as not to burſt by the force of the confined liquor. 4. Too great a degree of cold ſtops all fermentation, which can ſcarce proceed with leſs than thirty-ſix degrees of heat. 5. Too great heat (it ſhould not exceed ninety degrees) rather diſſipates and throws off the active principles of fermentation, than excites and promotes them. 6. The extraction of the elaſtic air by means of the air-pump, and, laſtly, a violent compreſſion of the ſame air with the fermentable matter, entirely prevents the origin, and ſtops the progreſs of fermentation.

FERMENTED, in general, ſomething that has undergone a fermentation. See the preceding article.

Fermented liquors are eſteemed great antidotes to putrefaction; accordingly the abſtinence from them is aſſigned as one cauſe why the Turks are more ſubject than other people to the plague, and other contagious diſtempers. It is likewiſe obſerved, that beer, wine, and ſpirituous liquors coming more into general uſe, has been one great means of ſuppreſſing putrid diſeaſes. See DRINK.

The ſpirituous part, is the life of all fermented liquors; it keeps the whole together, and, in a manner, embalms and renders them durable, and not ſubject to corruption. It alſo, in a great meaſure, gives them that aromatic refreſhing and reſtorative virtue, and the beſt effects they have on the human body.

FERMO, a port-town of Italy, ſituated on the gulph of Venice, about thirty miles ſouth of Ancona. It is an archbiſhop's ſee.

FERN, *filix*, in botany. See FILIX.

Fern is very common in dry and barren places. It is one of the worſt of weeds for lands, and very hard to deſtroy, where it has any thing of a deep ſoil to root in. In ſome grounds, the roots of it are found to the depth of eight feet. One of the moſt effectual ways to deſtroy it, is often mowing the graſs, and if the field be ploughed up, plentiful dunging thereof is very good: but a moſt certain remedy for it is urine. However, fern, cut while the ſap is in it, and left to rot upon the ground, is a very great improver of land; for if burnt, when ſo cut, its aſhes will yield double the quantity of ſalt that any other vegetable can do.

In ſeveral places in the north, the inhabitants mow it green, and burning it to aſhes, make thoſe aſhes up into balls, with a little water, which they dry in the ſun, and make uſe of them to waſh their linen with; looking upon it to be near as good as ſoap for that purpoſe. It is ſaid, that the frequent treading them down by ſheep, while that ſort of cattle feed upon them, is an infallible method of killing them.

The antients uſed the root of the fern and the whole plant, in decoctions and diet-drinks, in chronic diſorders of all kinds ariſing from the obſtructions of the viſcera, particularly in hypochondriac caſes, and in obſtructions of the ſpleen and pancreas. There are not wanting modern authors who give it as high a character in theſe caſes as the antients have done, but it is an ill taſted medicine, and in no great uſe in the ſhops. The country people eſteem it as a ſovereign remedy for that troubleſome diſtemper the rickets in children, and they give it alſo as a powder, after drying it in an oven, to deſtroy worms.

FERNANDO, or FERNANDES, an iſland in the Pacific ocean: weſt long. 83°, ſouth lat 33°.

FERRARA, a city and archbiſhop's ſee of Italy: eaſt long. 12° 6′, north lat. 44° 50′.

FERRE, or *le* FERRE, a city of Picardy, in France, forty miles ſouth-eaſt of Amiens: eaſt longitude 3° 26′, north latitude 49° 45′.

FERRET, *viverra*, in zoology, a quadruped of the muſtela kind. See the article MUSTELA.

The head is ſmall and depreſſed; the ſnout ſharp; the eyes look very fierce and red; the ears are ſhort, patulous, and erect, they are conſiderably wide, eſpecially towards the baſe; the mouth is large, and the teeth very ſharp; the neck is ſhort; the body is long and thin; the legs are ſhort, and each divided at the foot into five toes, and there armed with ſharp claws.

This animal is very frequent with us, but is a native of America. Our people uſe it in taking of rabbits; they plant nets at the mouth of the borrows, and turn in the ferret, after having muzzled him that he may not bite the rabbits, which are freightened by him out of their holes into the nets that are laid for them.

FERRETS, among glaſs-makers, the iron with which the workmen try the melted metal, to ſee if it be fit to work.

It is alſo uſed for thoſe irons which make the rings at the mouth of bottles.

FERRETTO, in glaſs-making, a ſubſtance which ſerves to colour glaſs.

This is made by a ſimple calcination of copper, but it ſerves for ſeveral colours: there are two ways of making it, the firſt is this. Take thin plates of copper, and lay them on a layer of powdered brimſtone, in the bottom of a crucible; over theſe lay more brimſtone, and over that another lay of the plates, and ſo on alternately till the pot is full. Cover the pot, lute it well, place it in a wind furnace, and make a ſtrong fire about it for two hours. When it is taken out and cooled, the copper will be found ſo calcined, that it may be crumbled to pieces between the fingers, like a friable earth. It will be of a reddiſh, and, in ſome parts, of a blackiſh colour. This muſt be powdered and ſifted fine for uſe.

FERRO, weſt long. 19°, north lat. 28°, the moſt weſterly of the Canary iſlands, near the african coaſt, where the firſt meridian was lately fixed in moſt maps, but now, the geographers of almoſt every kingdom make their reſpective capitals the firſt meridian, as we do London.

FERRO, ſome little iſlands ſituated in the northern ocean, 200 miles north-weſt of the Orcades, and as many ſouth-eaſt of Iceland: weſt long. 7°, north lat. 63°.

FERROL, a ſea-port-town of Spain, in the principality of Galicia, ſituated on a bay of the Atlantic ocean, twenty miles north-eaſt of the Groyne, and fifty miles north of Compoſtella, a good harbour, where the ſpaniſh ſquadrons frequently ſecured themſelves in the late wars: weſt longitude 8° 40′, north latitude 43° 30′.

FERRUGINOUS, any thing partaking of iron, or that contains particles of that metal.

It is particularly applied to certain mineral ſprings, whoſe waters are impregnated with the particles of iron, generally termed chalybeats. See the article CHALYBEAT.

FERRY, a liberty by preſcription, or the king's grant, to have a boat for paſſage, on a firth or river, for carrying paſſengers, horſes, &c. over the ſame for a reaſonable toll.

A ferry is in the nature of a common highway; and the not keeping it up has been held to be indictable.

FERTILITY, that quality which denominates a thing fruitful or prolific.

Nothing can produce fertility in either ſex, but what promotes perfect health: nothing but good blood, ſpirits, and perfect animal functions, that is, high health, can beget perfect fecundity; and therefore, all means and medicines, all noſtrums and ſpecifics to procure fertility, different from thoſe which procure good blood and ſpirits, are errant quackery. Dr. Cheyne ſays, that water-drinking males are very rarely infertile; and that if any thing in nature can prevent infertility and bring fine children, it is a milk and ſeed-diet perſevered in by both parents.

To increaſe the fertility of vegetables, ſays lord Bacon, we muſt not only increaſe the vigour of the earth and of the plant, but alſo preſerve what would otherwiſe be loſt: whence he infers, that there is much ſaved by ſetting, in compariſon of ſowing. It is reported, continues he, that if nitre be mixed with water to the thickneſs of honey, and after a vine is cut, the bud be anointed therewith, it will ſprout within eight days. If the experiment be true, the cauſe may be in the opening of the bud, and contiguous parts, by the ſpirit of the nitre; for nitre is the life of vegetables.

How far this may be true, is not perhaps ſufficiently ſhewn, notwithſtanding the experiments of Sir Kenelm Digby and M. Homberg. Conſult Mr. Evelyn's Sylva, the Philoſophical Tranſactions, the french Memoirs, and Dr. Stahl's Philoſophical Principles of Chemiſtry: but a proper ſet of accurate experiments ſeems ſtill wanting in this view.

FERULA, FENNEL-GIANT, in botany, a genus of the pentandria-digynia claſs of plants; the compound flower of which is uniform, and the particular ones made up of five oblong and almoſt equal petals: the fruit is of an elliptical compreſſed figure, marked with three prominent lines on each ſide, and containing two ſeeds of the ſame figure. See plate XCVI. *fig.* 3.

Sagapenum is ſaid to be the produce of a ſpecies of ferula. See SAGAPENUM.

FERULA, a little wooden pallet or ſlice, reputed the ſchoolmaſter's ſceptre, wherewith he chaſtiſes the boys, by ſtriking them on the palm of the hand.

Under the eaſtern empire, the ferula was the emperor's ſceptre, as is ſeen on variety of medals: it conſiſted of a long ſtem or ſhank, and a flat ſquare head. The uſe of it is very antient among the Greeks, who uſed to call their princes ferula-bearers.

FERULA, in the antient eaſtern church, ſignified a place ſeparated from the church, wherein the audientes were kept, as not being allowed to enter the church; whence the name of the place, the perſons therein being under penance or diſcipline. This word was ſometimes uſed to denote the prelate's crozier or ſtaff. See the article CROZIER.

FERULÆ, in ſurgery, ſplinters or chips of different matter, as of wood, bark, leather, paper, &c. applied to bones that have been disjointed, when they are ſet again.

FERULÆ is alſo a word uſed by the antients, to expreſs the horns growing on the deer or ſtag at the age of two years, at which early time thoſe horns are unbranched.

FESCENNINE VERSES, in roman antiquity, ſatyrical verſes, full of lewd and obſcene expreſſions, ſung by the company at the ſolemnization of a marriage.

FESCHAMP, a port-town of Normandy, thirty miles ſouth-weſt of Rouen.

FESSE, in heraldry, one of the nine honourable ordinaries, conſiſting of a line drawn directly acroſs the ſhield, from ſide to ſide, and containing the third part of it, between the honour-point and the nombril.

It repreſents a broad girdle or belt of honour, which knights at arms were antiently girded with. See plate XCVII. fig. 3.

FESSE POINT, is the exact center of the eſcutcheon. See the article POINT.

FESSE WAYS, or *in* FESSE, denotes any thing borne after the manner of a feſſe: that is, in a rank acroſs the middle of the ſhield.

Party per **FESSE**, implies a parting acroſs the middle of the ſhield, from ſide to ſide, through the feſſe point.

FESTI DIES, in roman antiquity, certain days in the year, devoted to the honour of the gods.

Numa, when he diſtributed the year into twelve months, divided the ſame into the dies feſti, dies profeſti, and dies interciſi. The feſti were again divided into days of ſacrifices, banquets, games, and feriæ. See the articles SACRIFICE and FERIÆ.

The profeſti were thoſe days allowed to men for the adminiſtration of their affairs, whether of a public or private nature: theſe were divided into faſti, comitiales, comperendini, ſtati, and præliares. See the article FASTI, *&c.*

The interciſi were days common both to gods and men, ſome parts of which were alloted to the ſervice of the one, and ſome to that of the other.

FESTINO, in logic, the third mood of the ſecond figure of ſyllogiſm, the firſt propoſition whereof is an univerſal negative, the ſecond a particular affirmative, and the third a particular negative: as in the following example:

FES No bad man can be happy,
TI Some rich men are bad men:
NO *Ergo*, ſome rich men are not happy.

FESTIVAL, the ſame with feaſt. See the article FEAST.

FESTOON, in architecture and ſculpture, *&c.* an ornament in form of a garland of flowers, fruits and leaves, intermixed or twiſted together.

It is in the form of a ſtring or collar, ſomewhat biggeſt in the middle, where it falls down in an arch; being extended by the two ends, the extremities of which hang down perpendicularly.

Feſtoons are now chiefly uſed in friezes, and other vacant places, which want to be filled up and adorned; being done in imitation of the long cluſters of flowers, which the antients placed on the doors of their temples and houſes on feſtival occaſions.

FESTUCA, in botany, a genus of graſſes, belonging to the triandria-digynia claſs; the flower of which is compoſed of two valves, and terminated by a ſtraight ariſta or awn: the ſeed is ſingle, of an oblong figure, very ſharp-pointed at each end, and marked with a longitudinal furrow.

To this genus belong the capon's tail graſs, wild oat graſs, or drank, *&c.* which are ſaid to be drying, and good againſt a ſtinking breath.

FETIPOUR, a city of the hither India, twenty-five miles weſt of Agra: eaſt long. 78° 40′, north lat. 27°.

FETLOCK, in the manege, a tuft of hair growing behind the paſtern joint of many horſes; for thoſe of a low ſize have ſcarce any ſuch tuft.

FETUS, or rather FOETUS. See the article FOETUS.

FEUD, *feodum*, the ſame with fee. See the article FEE ESTATE.

FEUDAL, or FEODAL, denotes any thing belonging to a fee. See the article FEE.

FEUDATARY, or FEODATARY, a tenant who formerly held his eſtate by feodal ſervice. See the article VASSAL.

FEUD-BOTE, a recompence for being concerned in a feud or quarrel.

FEVER, *febris*, in medicine, a diſeaſe, or rather claſs of diſeaſes, whoſe characteriſtic is a preternatural heat felt through the whole body, or at leaſt the principal parts of it. According to Sydenham, a fever is nothing elſe but the effort of nature, to free herſelf of ſome morbific matter, which ſhe finds injurious, in order to eſtabliſh a better health.

If any diſeaſe deſerves the title of univerſal, it is a fever, becauſe it diſturbs the whole nervous ſyſtem, and perverts all the functions of the body, inſomuch that the motion of the heart, arteries and ſolids ceaſe to be equal and juſt; the circulation of the blood and other fluids, to be free and natural; and the ſalutary ſecretions and excretions, to be regular; even the mind itſelf, when ruffled by the febrile onſet, is affected with a delirium. Beſides, this diſeaſe attacks all mankind, of what conſtitution, ſex, or age, in all climates, let their diet and way of living be what they will: ſometimes it is epidemic, and ſeizes many at a time. A fever is not always a primary diſeaſe, but is often the ſymptom of other maladies, as a cachexy, ſcurvy, phthiſis, lues venerea, dropſy, *&c.* and renders them more cruel and dangerous; however, it is not always pernicious to the human race, but ſometimes vanquiſhes its own cauſe, and ſupervening to other diſeaſes, expels them out of the body: thus palſies, epilepſies, convulſions, ſpaſmodic and hypochondriac affections, have been cured by fevers; and many valetudinarians have, by a fever, been reſtored to a healthful and vigorous conſtitution.

Hence the moſt general and natural diviſion of fevers, is into eſſential and ſymptomatic.

An eſſential fever is ſuch whoſe primary cauſe lies in the blood itſelf, deriving its original from no other diſtemper of the ſolid parts, or any way depending on them; and this is abſolutely ſpeaking a fever properly ſo called.

A ſymptomatic is a ſecondary fever, which does not properly ſubſiſt of itſelf, but owes its origin to the diſorder of ſome particular part, and moſt commonly depends on ſome remarkable inflammation; from whence proceed the variety of inflammatory fevers, peculiarly ſo called.

The general cauſes of FEVERS. "The "cauſe of fevers is not heat alone, ſays "Hippocrates, *de vet. medic.* but heat "and bitterneſs together, heat and acidity, heat and ſaltneſs, and innumerable other combinations in the blood." It is found, nevertheleſs, by experience, that ſome perſons, from ſound and perfect health, where there has been neither a plethora or any cacochymical diſpoſitions to cauſe it, have fallen into a fever, becauſe, perhaps, ſome very extraordinary alteration in the air, or ſome great change in their way of living, or ſome conſiderable error in the ſix non-naturals, have happened. Sound bodies may, on ſuch occaſions, be ſeized with a fever, only to the end that their blood may acquire a new ſtate and condition, thereby to accommodate itſelf to the alterations of the air, way of living, &c.

The formal or fundamental cauſe of a fever, conſiſts in the ſpaſmodic affection of the whole nervous and fibrous genus, which chiefly proceeds from the ſpinal marrow, and ſucceſſively from the external to the internal parts: this plainly appears from the uſual paſſions and phænomena of a fever. Hence it naturally follows, that whatever has a power to irritate and ſolicite the nervous and vaſcular ſyſtem to ſpaſms, is moſt likely to generate a fever. To this claſs belong violent paſſions of the mind, eſpecially terror and anger; a poiſonous, ſubtile, cauſtic matter, either bred within the body, or received by infection; a ſtoppage of perſpiration; a ſuppreſſion of critical ſweats; eruptions driven back; an abundance of purulent, ulcerous matter, adhering to various parts; aliments over and above acrid and ſalt; abuſe of ſpirituous liquors; corrupt and bilious crudities lodged in the primæ viæ; exceſſive watching; a violent pain and tenſion of the nervous parts; inflammations; tumours and abſceſſes; hurting the nervous parts by ſharp inſtruments; acrid and corroſive drugs; cold baths; and, on the contrary, thoſe that are too hot or aſtringent.

According to the different nature of theſe cauſes, and their various manner of affecting the nerves, ariſe fevers of divers kinds; ſome are benign, others malignant; ſome are intermitting, others continual; ſome are ſimple, others are compound; ſome are regular, others anomalous; others eruptive, ſpotted, putrid, hectic, or ſlow; ſome admit of an eaſy cure, others a difficult; ſome ſoon terminate, others are protracted a long time, and ſome again hurry the patient out of the world.

The general ſigns of FEVERS are a pain in the back, more particularly about the loins; a coldneſs, eſpecially of the extreme parts; a ſhivering; a ſhaking; trembling; a livid colour of the nails; a ſubſidence of the veſſels in the hands and feet; a ſhrunk, dry ſkin; a yawning; a ſtretching; a pale livid countenance; a trembling and palpitating motion of the heart; an anxiety of the præcordia; difficult breathing; inquietude, reſtleſſneſs, a ſenſation of an ebullition of the blood about the heart; a contracted, weak, ſmall pulſe; a nauſea, and an inclination to vomit; a ſuppreſſion of perſpiration; coſtiveneſs, with thin watery urine. When the ſymptoms are very urgent, and very haſtily make their progreſs, the fever is called acute; when they are more mild and gentle, it is denominated a ſlow fever.

The general cure of FEVERS is ſummarily comprehended in conſulting the ſtrength of nature, in correcting and diſcharging the acrimony from the blood, in diſſolving groſs humours, and expelling them, and in mitigating the ſymptoms. If we perceive the ſymptoms run high, and nature to grow exorbitant, we muſt moderate it, and enjoin abſtinence, a ſlender diet, drinking water, bleeding, cooling clyſters, &c. If nature ſeems to be too ſluggiſh, ſhe is to be excited by cordials, aromatics, volatiles, &c.

By how much the more acute a fever is, by ſo much the more ſparing and ſlender ought the diet to be. In fevers, though the patient lies many days without eating any thing, it is no matter: on the contrary, by eating and drinking, the fever would be exaſperated.

Vomits in almoſt all fevers are of advantage, eſpecially in the beginning. Even nature herſelf teaches us the uſe of ſudorifics; they are moſt beneficial when the ſigns of concoction appear; and they are alſo uſeful through the whole courſe of the diſtemper; yea, even by the promiſcuous uſe of them, fevers are often cured. Spirit of ſal armoniac, or its volatile ſalt, is eſteemed an univerſal febrifuge, which, being given pretty often, ſeldom fails of ſucceſs. All ſugared things are very hurtful in fevers.

In acute and inflammatory fevers, but a very few medicines are required; for it will be ſufficient diligently to obſerve the ways that nature aims to relieve herſelf by, and to forward the cure in thoſe ways, by aſſiſting her. If there be any obſtructions in the bowels, we are to take care, by proper evacuations, to remove the load, and by that means take away ſome of the fuel of the diſtemper. If the blood be too furiouſly agitated, we are to quell ſuch an impetuoſity: if it be embarraſſed with groſs and coagulated humours, we are to endeavour at diſſolving it, and rendering it more fluid. In the due obſervation of theſe three precepts, conſiſts, in a great meaſure, the whole cure of fevers, where the viſcera are ſound, and the peccant humours are lodged in the blood, or in the primæ viæ; and then, when nature tends to produce a criſis, or ſhe has already begun it, we are altogether to refrain from the uſe of medicines, as much as we would avoid the plague.

They are groſsly miſtaken who, in acute and inflammatory diſorders, make uſe of abundance of medicines ſo long, till nature, not knowing which way to turn herſelf, but being variouſly diſtracted to and fro, both by the violence of the diſtemper and the burden of the medicines, is at laſt forced to yield: for the orderly motion of nature being diſturbed and diſtracted with the repetition of much medicines immethodically given, the fever is not leſſened, and the criſis is poſtponed; and the patient, expoſed to a dubious event, either dies, or falls into a chronical diſtemper.

Therefore, ſince nature is the phyſician, it is a pernicious practice to ſuſpend, ſuppreſs, or deſtroy the febrile motions, which have a tendency to health. The moſt ſalutary work of nature ought rather to be promoted, which deſigns, by an increaſed progreſſive motion of the fluids, to correct, reſolve, and at length to expel the morbific matter. And this is beſt performed by diluting, moiſtening, attemperating, aperient, corroborating and nitrous medicines; as alſo by thoſe which in the time of the intermiſſion, eſpecially tend to promote the proper excretions.

In all fevers, the drinking plentifully of warm weak liquors, is attended with many good conſequences: the patient is always refreſhed by it; the febrile heat is mitigated, and reſt is promoted; and the proper and neceſſary ſweats forwarded. Among theſe liquors, the common barley-water, teas made of ſage, mint, baum, *&c.* with the milder alexipharmic roots, are moſt proper: with theſe, powders are to be given, compoſed of the abſterſive and digeſtive ſalts: they ſhould be ſated with lemon-juice, and then mixed with a little nitre, and may be given every three, four, or ſix hours, as the urgency of ſymptoms require. Emulſions of ſweet almonds, and the cooling ſeeds, are alſo very proper between whiles.

The medicines by which the phyſician is to aſſiſt nature in her buſineſs of excretion, are the gentle diaphoretics; among which the diaphoretic antimony, when truly prepared, holds a very high place: alexipharmics, which have alſo a diuretic virtue, ſuch as the mixtura ſimplex, when faithfully prepared and lightly camphorated, are very proper. All violent medicines are to be dreaded in fevers. Acids, in general, are by many much dreaded, but there is no real ground for this; on the contrary, in ſanguineous fevers, during the time of the violent heat, and immoderate thirſt, they are found of the greateſt uſe and benefit. The uſe of aſtringent medicines, though too common, yet is extremely improper in all fevers. Nitre is an admirable remedy for fevers in general.

The general criſis of Fevers. Whereas there is no fever cured without ſome conſiderable evacuation, raiſed either by nature or by art, the phyſician ought carefully to obſerve which way nature ſeems to intend the expulſion of the morbid matter, and aſſiſt her by all poſſible means. Now this expulſion is frequently made through ſeveral outlets of the body at a time, and an evacuation by one outlet, more or leſs, checks that by another: thus a looſeneſs checks ſweat, and *vice verſa.* Wherefore it is the phyſician's buſineſs to conſider what evacuation is moſt likely to be of ſervice, and ſo to promote this, as to give the leaſt interruption poſſible to any other, for any one evacuation is not equally ſuitable to all perſons, both on account of the difference of conſtitutions, and of diſeaſes; although evacuations through every emunctory, are ſometimes neceſſary, as we find by experience in malignant fevers.

But of all ſolutions of the diſeaſe, the moſt deſirable is by ſweat; next to that, by ſtool and urine: the worſt is by a hæmorrhage, whether it proceeds from the noſe, or from any other part, becauſe it indicates that the blood is ſo far vitiated, that no proper ſeparation of the humour can be made.

Laſtly, ſome fevers terminate in abſceſſes, formed in the glands, which, if they happen in the decline of the diſeaſe, and ſuppurate kindly, are ſalutary. Wherefore the ſuppuration is to be forwarded by cataplaſms, or plaſters; and ſometimes by cupping on the tumor; and then, if the abſceſs do not break ſpontaneouſly, it ought to be opened, either with a knife, or with a cauſtic. At this time this rule of practice is generally right, not to exhauſt the patient's ſtrength by evacuations of any kind. And yet in ſome caſes there is a neceſſity for drawing a little blood, as when the humours are in great commotion, and the heat exceſſive: for this remedy prudently adminiſtred, makes the tumor ripen kindly, becauſe nature has always a great abhorrence of a turbulent ſtate.

But in order to give a more diſtinct notion of the ſeveral kinds of fevers, it will be neceſſary to treat them particularly.

Bilious FEVER. See the article BILIOUS.

Burning FEVER, CAUSUS, attacks the patient with great fury and rage, with an exceſſive burning heat, an intolerable thirſt, and other ſymptoms demonſtrating a great and remarkable inflammation of the blood; the reſpiration is thick, difficult, and quick; the tongue is dry, yellow, parched and rough; there is a loathing of food, a nauſea and vomiting, a little cough, a delirium, a coma, convulſions, and other general ſymptoms already mentioned.

On the third and fourth day it often proves mortal; it ſeldom exceeds the ſeventh, if violent.

It is often terminated by a hæmorrhage, which, if ſmall on the third and fourth day, is a fatal ſign. A ſolution of this fever, on a critical day, may alſo be by vomiting, ſtool, ſweat, urine, and ſpitting thick phlegm. If the exacerbation of this diſeaſe happens on the ſecond or fourth day, it is a bad ſign, on the ſixth not ſo bad.

As to the cure of a burning fever, ſo far as it differs from the general treatment already preſcribed, bleeding is neceſſary at the beginning, if there is a plethora, or ſigns of particular inflammation; or the heat intolerable, or the rarefaction too great, or a revulſion neceſſary, or the ſymptoms urgent, and not to be vanquiſhed any other way.

Soft, diluting, laxative, antiphlogiſtic, cooling clyſters, are to be repeated as oft as the heat, coſtiveneſs and revulſion requires them; the whole body is to be moiſtened by receiving into the noſtrils the ſteam of warm water, by waſhing the mouth, throat, feet, and hands with the ſame; and by fomenting with warm ſponges the places where the veſſels are moſt numerous. Purgatives are dangerous before the criſis, but clyſters may be uſed made of milk, honey, and a little nitre. After the criſis, which is known by the ſediment of the urine, laxatives made with tamarinds, manna, rhubarb, raiſins, or cream of tartar, are neceſſary. If a phrenſy happen, cauſe bleeding of the noſe, by thruſting up a ſtraw, or with a ſcarifying knife: uſe alſo frictions of the feet and legs, with hot cloths.

Catarrhal FEVER may be reckoned in the claſs of ſlow fevers, which, in the beginning, is attended with a catarrh, a coryza, cough, hoarſeneſs, *&c.* Theſe fevers are moſt commonly gentle and ſlow by day-time, generally ſomewhat worſe in the evenings: they are attended with a great wearineſs of the limbs, the ſymptoms continue with an increaſe of the coryza and cough, until the diſtemper ariſes to its higheſt pitch, when the matter of the catarrh is ripened, and the mucus, becoming thicker, is diſcharged, and the fever ceaſes: the ſeat of this diſtemper is in the conglobate glands.

In a catarrhal fever a decoction of ſaſſafras wood is convenient, with liquorice roots and raiſins, on account of the acrimony of the humours. Alſo the expreſſed juice of turnips, with a little ſugar; volatiles and ſudorifics, a ſolution of gum ammoniac; and for the further treatment of this diſorder, ſee the article CATARRH.

Colliquative FEVER is that in which the body is much emaciated and conſumed in a ſhort ſpace of time, the ſolid parts, and the fat itſelf waſted, ſometimes by a diara diarrhœa, ſometimes by ſweat, by urine, or by feveriſh heats alone, without any ſenſible diſcharge. A colliquative fever is obſerved to accompany a cancer of the breaſt, with a diarrhœa. See the articles DIARRHOEA, DIABETES, CANCER, *&c.*

For this diſeaſe, emulſions of almonds, and of the four cold ſeeds, as alſo aſs's, goat's, or woman's milk, are proper; or cow's milk with the juice of water-creſſes; chicken broth, broth made of river crabs, or wood ſnails bruiſed.

Continual FEVER, the ſame with ſynochus. See the article SYNOCHUS.

Diary FEVER, the ſame with ephemera. See the article EPHEMERA.

Epidemic FEVER. See EPIDEMIC.

Eruptive FEVER. See the articles MILIARY FEVER, ERYSIPELAS, *&c.*

Gaol, camp, or *hoſpital* FEVER. See the article HOSPITAL FEVER.

Hectic FEVER. See HECTIC FEVER.

Hypochondriac FEVER, or PASSION. See HYPOCHONDRIAC PASSION.

Inflammatory FEVER. See the article INFLAMMATORY.

Intermitting FEVER. See INTERMITTING, QUOTIDIAN, TERTIAN, *&c.*

Malignant FEVER. See the articles MALIGNANT, PETECHIÆ, HOSPITAL FEVER, and MILIARY FEVER.

Meſenteric FEVER. See MESENTERIC.

Miliary FEVER. See MILIARY.

Milk FEVER. See the article MILK.

Nervous FEVER, at firſt, affects the patient with a ſlight, tranſient chilneſs, ſeveral times in a day; alſo with uncertain fluſhes of heat, a liſtleſneſs, laſſitude, and wearineſs.

The patient has a drineſs of the lips and tongue, without any conſiderable thirſt: they have frequent nauſeas, with reaching to vomit, but little brought up: the breathing is difficult by intervals, and eſpecially towards night: there is an exacerbation of the ſymptoms, with a low, quick, and unuſual pulſe: the urine is pale, and made often, and ſuddenly; a torpor or obtuſe pain, and coldneſs often affect the hind part of the head, or a heavy pain is felt along the coronary ſuture. The pulſe is very remarkable in this diſeaſe, for it is generally low, quick and unequal.

Gilchriſt makes this ſtate previous to the fever, and ſays, that for a fortnight, or three weeks, before they are laid down, they ſhall be low-ſpirited, inappetent, loaded, ſleep ill, ſigh frequently, groan involuntarily, and feel unexpreſſible diſorder, accompanied with fear, concern, and dejection, and perhaps ſlight alienations of mind. The ſame author ſays, that this diſorder is frequently occaſioned by people expoſing themſelves indiſcretly to the ſun, or by being fatigued in it; by eating largely of fruit, or drinking bad wine; or by being long under a courſe of anxiety, care, fear, diſcouragement, and other enervating paſſions, together with irregularities of diet, *&c.* It commonly attacks people of weak nerves, and a lax habit of body, and is occaſioned by an acrimony that gives an univerſal ſtimulus.

The cure is to be performed with gentle volatile medicines of the cordial and diaphoretic kind, in order to promote perſpiration, by the application of bliſters, and by a proper regimen and method of diet. In the beginning a gentle emetic may be given, or a ſmall doſe of rhubarb; when it has continued long, bleeding and ſweating is very prejudicial. In giving the diaphoretic, we ſhould always have regard to the urine, for if that from being pale, gradually heightens to an amber colour, we are right in our doſe, eſpecially if, in bed, a gentle dew or moiſture comes on, without a reſtleſneſs. A little chicken broth is of ſervice, both as food and phyſic, eſpecially towards the decline of the diſorder. Alſo, thin jellies of hartſhorn, ſago, panado, adding a little wine to them; at this time alſo, if the ſweats are copious and weakening, it is proper to give ſmall doſes of the tincture of the bark, with ſaffron and ſnake-root, interpoſing now and then a doſe of rhubarb, to carry off the putrid colluvies.

Peripneumonic FEVER. See the article PERIPNEUMONY.

Peſtilential FEVER. See PLAGUE.

Petechial FEVER. See the articles PETECHIÆ and MALIGNANT.

Pituitous FEVER, the ſame with catarrhal *ſupra*.

Scarlet FEVER. See SCARLET.

Scorbutic FEVER. See SCURVY.

Slow FEVER, much reſembles the hectic fever, but has milder ſymptoms, and a gentler heat than the hectic. See the article HECTIC.

This fever is attended with profuſe ſweats after ſleeping; after which, and before noon, the pulſe is natural, as in the hectic; but there is not ſuch a want of appetite, nor exceſſive weakneſs, nor dryneſs of the ſkin, nor ſuch dark coloured urine, nor ſuch danger, as in the hectic.

The cauſe of a ſlow fever lies moſtly in the fluids. It ariſes from obſtinate intermittent, or continual fevers; from the ſmall-pox and meaſles; from profuſe hæmorrhages; from long diarrhœas, dyſenteries; from an exceſſive ſalivation, gonorrhœa, or fluor albus; from care, watching, intenſe ſtudy, hard, continual labour, inordinate coition, or the abuſe of ſpirituous liquors. In the cure of this diſeaſe reſpect muſt always be had to the cauſe. If it proceeds from crudities, it is known by a languid feebleneſs, internal heat, propenſity to ſweat, eſpecially in the balls of the hands, and ſoles of the feet; in which caſe the ſtomach and parts adjacent muſt be cleanſed from the ſordes by a gentle vomit of ipecacuanha. After the alimentary canal is cleanſed, you muſt proceed to analeptics and ſtomachics.

If the diſorder is in the hypochondria, when the patient is plethoric, cacochymical, cachectical, or ſcorbutical, or the menſes or hemorrhoidal evacuations are ſtopped, and occaſion this diſorder; or, if it proceeds from voraciouſneſs, or bad diet, or the abuſe of ſpirituous liquors, then endeavours muſt be made to free the liver, ſpleen, and meſentery, and its veſſels and glands from obſtructions: for this purpoſe mineral waters are proper; as are alſo the thermæ, or hot bath waters. Where theſe cannot be had a decoction of thin veal broth, with the roots of ſuccory, fennel, aſparagus, dog-graſs, and viper's graſs, are proper; drinking a quart a day for ſome weeks; and before it ſome preparations of ſteel, as the tincture of ſteel, or of martial flowers. If from an eroſion of the ſtomach and bowels, all ſharp, ſalt, and ſtimulating things are as bad as poiſon. In this caſe a decoction of ſaſſafras, and the bark of eleutherius in milk, as alſo chamomile flowers, and the tops of yarrow, drank about a quart a day, are of great uſe: as are alſo the root of marſh mallows, or rice boiled in milk; or gum dragant, diſſolved in water.

If from the loſs of neceſſary fluids, and want of ſtrength, then it may be termed a colliquative fever, and muſt be treated as already directed in the treatment of that fever, above.

If it proceeds from the abuſe of ſpirituous liquors, all heating liquors ſhould be avoided, as alſo analeptics and ſtomachics. Gruel will be proper, with ſuccory root, red poppy flowers, and ſome ſtibiated nitre.

If this fever proceeds from a ſuppreſſion of the menſes, it requires immediate bleeding in the foot, and reſolvent decoctions of ſuccory-roots, leaves of ſow-thiſtles, daiſies, and elder-flowers, forbearing all ſtrong emmenagogues.

If from a maraſmus ſenilis, and that the patient has been addicted to a ſedentary inactive life, his appetite remaining good, and has omitted accuſtomary bleeding, or the ſpontaneous evacuations of blood are ceaſed, bleeding is indicated, and wholeſome diluters muſt be freely drank, abſtaining from food of too plentiful nouriſhment, and uſing convenient exerciſe; but if the diſorder proceeds from a plenty of impure ſalt ſerum, not ſecreted through the ſkin, or otherwiſe, the ſordes muſt be carried off by gentle laxatives of manna, rhubarb and raiſins, and the roſcid juices muſt be renewed by jellies and aſſes milk.

Synochus FEVER. See SYNOCHUS.

Yellow FEVER. See the article BILIOUS FEVER.

FEVERS *of children* are all owing to acidity, the primary cauſe of all the diſorders that affect them; and the whole cure depends upon vanquiſhing that enemy.

This is to be done two ways; the firſt is to prepare the acidity, and render it fit for expulſion; and then to purge it away by ſuitable evacuants. To prepare the acid does not require ſudorifics, but abſorbents; and though theſe are numerous, the powder of crab's claws is the chief. Purging to ſome may ſeem dangerous, but Sydenham has ſhewn us, that it is ſafe and ſalutary in the fevers of adults, inſomuch that he depends entirely upon it for the cure of the epidemic winter-fever; and it has been found of excellent uſe in the fevers of children. They recommend in this caſe a pearl julep, made by adding a dram of prepared pearls to two ounces of the ſimple waters, and two drams of the compound; the doſe is three ſpoonfuls. When there is any unuſual ſymptoms ariſing from putrid humours, they preſcribe about ſix grains of æthiops mineral the night before the purge, in a ſmall ſpoonful of any agreeable ſyrup. After the purge, the teſtaceous powders are to be given three or four times in twenty-four hours for two days and nights, and then the purge is to be repeated.

FEVERFEW, the engliſh name of a plant, called by botaniſts matricaria. See the article MATRICARIA.

Baſtard-FEVERFEW. See PARTHENIUM.

FEVERSHAM, a port-town of Kent, and one of the cinqueports. See the article CINQUEPORT.

It ſtands ſeven miles weſt of Canterbury.

FEUILLANS, an order of bare-footed monks, who obſerve the ſame rules with the bernardines. See BERNARDINES.

FEUILLE DE SCIE, among the french heralds, imports that an ordinary, as a feſſe or a pale, is indented only on one ſide; ſo called on account of its reſemblance to a ſaw-blade, as the words ſignify.

FEVILLEA, in botany, a genus of the monoecia ſyngeneſia claſs of plants, the flower of which is monopetalous, divided into five ſegments at the limb, and rotated: the fruit is a very long fleſhy berry, with a hard rind, and containing compreſſed orbicular ſeeds. It is called by Plumier, *nhandiroba*.

FEURS, a town of France, ſituated on the river Loyre, twenty-ſeven miles weſt of Lyons.

FEWEL, or FUEL. See the article FUEL.

FEZ, the capital of the empire of Fez and Morocco, in Africa: weſt longitude 6°, north latitude 33° 30′.

It is a large and populous city, and the uſual reſidence of the emperor. See the article MOROCCO.

FIASCONE, a city and biſhop's ſee of Italy, about twelve miles ſouth of Orvietto.

FIAT, in law, a ſhort order or warrant ſigned by a judge, for making out and allowing certain proceſſes.

FIAT JUSTITIA, is where the king, on a petition to him for his warrant to bring a writ of error in parliament, writes on the top of it *fiat juſtitia*, let juſtice be done; upon which the writ of error is made out.

FIBER, the beaver, in zoology, is made, by Linnæus, a ſpecies of caſtor. See the article CASTOR.

FIBRARIÆ, a claſs of foſſils, naturally and eſſentially ſimple, not inflammable nor ſoluble in water, and compoſed of parallel fibres, ſome ſhorter, others longer; their external appearance being bright, and in ſome degree tranſparent: add to this, that they never give fire with ſteel, nor ferment with, or are ſoluble in acid menſtrua.

To this claſs belong the aſbeſtus, amianthus, tricheriæ, and lachnides. See the articles ASBESTUS, AMIANTHUS, *&c.*

FIBRE, in anatomy, a perfectly ſimple body, or at leaſt as ſimple as any thing in the human ſtructure; being fine and ſlender like a thread, and ſerving to form other parts. Hence ſome fibres are hard, as the bony ones; and others ſoft, as thoſe deſtined for the formation of all the other parts.

The fibres are divided alſo, according to their ſituation, into ſuch as are ſtraight, oblique, tranſverſe, annual, and ſpiral; being found arranged in all theſe directions, in different parts of the body, for an account of which ſee BONE, MUSCLE, NERVE, ARTERY, VEIN, *&c.*

FIBRE is alſo uſed to denote the ſlender filaments which compoſe other bodies, whether animal, vegetable, or mineral; but more eſpecially, the capillary roots of plants. See PLANT, WOOD, *&c.*

FIBRILLA, a term ſometimes uſed for a very minute or ſlender fibre.

FIBROSE, ſomething conſiſting of fibres, as the roots of plants. See ROOT.

FIBULA, in anatomy, the outer and ſmaller bone of the leg, called alſo perone. It is nearly of a triangular figure, and ſtands parallel to, but diſtant from the tibia, or inner bone of the leg. Its upper extremity does not reach to the os femoris, but is only joined to the external ſide of the tibia; and its lower extremity, called malleolus externus, concurs in the articulation of the tarſus, which its eminence ſerves to ſtrengthen, by rendering a luxation leſs eaſy. It has no particular motion of its own, but wholly follows that of the tibia.

Fractures of the FIBULA. See the article FRACTURE.

Luxation of the FIBULA. Sometimes the fibula is ſeparated by external violence from the thigh-bone, and is then diſtorted either upwards or downwards; this generally happens, when the foot has been luxated outwards. Whenever this happens, the bone is to be firſt reſtored to its natural place, and then properly bound up, and left to the aſſiſtance of nature and reſt, till it be grown firm again to the tibia and leg. Heiſter directs, that the patient, in this and the like caſes, be always ſtrictly cautioned not to uſe or bear any ſtreſs upon the diſordered leg too ſoon; the conſequence of which may be worſe than the firſt misfortune. For the reſt of the treatment, ſee the article LUXATION.

FIBULÆUS, a muſcle of the leg, more uſually called peronæus. See PERONÆUS.

FICARIA, in botany, the name by which Dillenius calls a ſpecies of ranunculus, called by Boerhaave chelidonium minus. See the article RANUNCULUS.

FICEDULA, in ornithology, a name given to ſeveral ſpecies of motacilla, particularly the brown kind, with a ſpotted breaſt, and white belly. See MOTACILLA.

FICHE', or FITCHE'E, in heraldry. See the article FITCHE'E.

FICOIDES, a name given to ſeveral diſtinct plants, as the meſembryanthemum, muſa, and opuntia. See the article MESEMBRYANTHEMUM, &c.

FICTION. See the article FABLE.

FICUS, the FIG-TREE, in botany, a genus of the cryptogamia claſs of plants, producing male and female flowers ſeparate, neither of which have any flower-leaves: the ſtamina are three ſetaceous filaments, of the length of the cup; and the fruit is large, fleſhy, and of a turbinated figure; being properly nothing but the common calyx or cup of the fructification. See the article FIG.

FIDA, a town on the ſlave-coaſt of Guinea: eaſt long. 3°, and north lat. 6°.

FIDD, in the ſea-language, an iron, or wooden pin, to ſplice and faſten ropes together. It is made taper-wiſe, and ſharp at one end. The pin in the heel of the top-maſt, which bears upon the cheſſe-trees, is likewiſe called a fidd.

FIDD HAMMER, one whoſe handle is a fidd, or made taper-wiſe.

FIDDLE, or VIOLIN. See VIOLIN.

FIDE JUSSOR, among civilians, the ſame with a ſurety. See the article SURETY.

FIDEI COMMISSUM, in roman antiquity, an eſtate left in truſt with one perſon, for the uſe of another. See TRUSTEE.

FIDICINALES, muſcles of the fingers, otherwiſe called lumbricales. See the article LUMBRICAL.

FIEF, or FEE. See the article FEE.

FIELD, *campus*, in agriculture, a piece of ground incloſed, whether for tillage or paſture.

The ſquare contents, or ſuperficies, of a field may be eaſily found, by the rules of ſurveying. See SURVEYING.

FIELD, in antiquity, the ſame with campus. See the article CAMPUS.

FIELD, in heraldry, is the whole ſurface of the ſhield, or the continent, ſo called becauſe it containeth thoſe atchievements antiently acquired in the field of battle. It is the ground on which the colours, bearings, metals, furs, charges, &c. are repreſented. Among the modern heralds, field is leſs frequently uſed in blazoning than ſhield or eſcutcheon. See the article SHIELD, &c.

FIELD, in a military ſenſe, denotes the place where a battle was fought.

Cloſe FIELD was antiently a place railed in with a barrier, for the performance of juſts and tournaments.

FIELD, among painters, is more uſually called ground. See the article GROUND.

FIELD-BOOK, in ſurveying, that wherein the angles, ſtations, diſtances, &c. are ſet down. See SURVEYING.

FIELD-COLOURS, in war, are ſmall flags of about a foot and a half ſquare, which are carried along with the quarter-maſter general, for marking out the ground for the ſquadrons and battalions.

FIELD-FARE, in ornithology, the engliſh name of the variegated turdus, with a hoary head. See the article TURDUS. It is larger than the common black-bird, and with us is a bird of paſſage, coming over in great numbers in winter. See plate XCVII. fig. 4.

FIELD-FORT, in fortification. See FORT.

FIELD-OFFICERS, in the art of war. See the article OFFICER.

FIELD-PIECES, ſmall cannons, from three to twelve pounders, carried along with an army in the field. See CANNON.

FIELD-STAFF, a weapon carried by the gunners, about the length of a halbert, with a ſpear at the end; having on each ſide, ears ſcrewed on, like the cock of a match-lock, where the gunners ſcrew in lighted matches, when they are upon command; and then the field-ſtaffs are ſaid to be armed.

FIELD-WORKS, in fortification, are thoſe thrown up by an army in beſieging a fortreſs, or by the beſieged to defend the place. Such are the fortifications of camps, highways, &c.

Elyſian FIELDS. See ELYSIUM.

FIERENZUOLO, a town of Italy, ten miles ſouth-eaſt of Placentia.

FIERI FACIAS, in law, a writ that lies where a perſon has recovered judgment for debt or damages in the king's courts againſt one, by which the ſheriff is commanded to levy the debt and damages on the defendant's goods and chattels. This writ muſt be ſued out within a year and a day after the judgment obtained, and where two fieri facias's againſt one perſon are delivered to the ſheriff the ſame day, he ought to execute that firſt which was firſt delivered; but if he executes the laſt firſt, the execution will be good, though the other party in ſuch caſe may have an action againſt him.

FIFE, in muſic, is a ſort of wind inſtrument, being a ſmall pipe.

FIFE, in geography, a county of Scotland, bounded by the Frith of Tay on the north; by the German ſea on the eaſt; by the Frith of Forth on the ſouth, and by Menteeth and Sterling on the weſt.

FIFE-RAILS, in a ſhip, are thoſe that are placed on baniſters, on each ſide of the top of the poop, and ſo along with hances or falls.

They reach down to the quarter-decks, and to the ſtair of the gang-way.

FIFTEENTH, an antient tribute or tax laid upon cities, boroughs, *&c.* through all England, and ſo termed becauſe it amounted to a fifteenth part of what each city or town had been valued at; or it was a fifteenth of every man's perſonal eſtate according to a reaſonable valuation. In Doomſday book, there are certain rates mentioned for levying this tribute yearly; but ſince, any ſuch tax cannot be levied but by parliament.

FIFTH, in muſic, one of the harmonical intervals or concords. See the article INTERVAL.

The fifth is the ſecond in order of the concords, the ratio of the chord that affords it is 3 : 2. See the articles CHORD and CONCORD.

It is called a fifth, as containing five terms or ſounds between its extremes, and four degrees, ſo that in the natural ſcale of muſic, it comes in the fifth place or order from the fundamental. The antients called this fifth diapente. The imperfect and defective fifth called by the antients ſemi-diapente is leſs than the fifth by a leſſer ſemitone. See the articles DIAPENTE, SEMITONE, *&c.*

FIG, the fruit of the ficus, or fig-tree. See the article FICUS.

Figs, as well freſh as when dry, are very wholeſome food: they are nutritive and emollient: they are good alſo in the diſorders of the breaſt and lungs; but it is to be obſerved, that a too free uſe of them has ſometimes brought on obſtructions of the viſcera, which are very common complaints alſo where they are eaten as food, as they are with bread by the poor people in many parts of the Levant. They are frequently made ingredients in our pectoral decoctions, and are by ſome greatly recommended againſt nephritic complaints. They are much uſed externally by way of cataplaſm, either roaſted or boiled in milk, for the ripening of tumours, and for eaſing the pain of the piles. Figs ſhould be choſen large, of a pale browniſh colour, ſoft and mellow, heavy, and when broken, with the pulpy ſubſtance yellowiſh and ſweet, and of a ſoft glutinous texture.

Figs the hundred weight pay on importation 9s. $6\frac{50}{100}$d. the drawback on exportation is 8s. 9d. at the rate of 6l. the hundred weight.

FIG, in farriery, a ſort of wart on the fruſh, and ſometimes all over the body of a horſe. The figs that appear on the fruſh or ſole make an evacuation of malignant ſtinking humours that are very hard to cure.

FIG-SHELL, a ſpecies of dolium. See the article DOLIUM.

FIGWORT, a plant called by the botaniſts ſcrophularia. See SCROPHULARIA.

Indian FIG. } See { OPUNTIA.
Infernal FIG. } See { ARGEMONE.

Marygold FIG. See MESEMBRYANTHEMUM.

Pharaoh's FIG. See the article MUSA.

FIGHT, or *Sea*-FIGHT. See BATTLE.

Running-FIGHT, that in which the enemy are continually chaſed.

FIGHTS, in a ſhip, are the waſte clothes hung round about a ſhip in a fight, to keep the men from being ſeen by the enemy.

Cloſe FIGHTS, the bulk-heads, fore and aft the ſhip, put up for the men to ſtand ſecure behind in caſe of boarding, and fire upon the enemy.

FIGHTWITE, a fine or mulct for fighting or creating a quarrel.

FIGUERRE, a town of Catalonia in Spain, ten miles weſt of Roſes.

FIGURAL, FIGURATE, or FIGURATIVE, a term applied to whatever is expreſſed by obſcure reſemblances. The word is chiefly applied to the types and myſteries of the moſaic law; as alſo to any expreſſion which is not taken in its primary and literal ſenſe.

FIGURAL, or FIGURATE NUMBERS, are ſuch as do or may repreſent ſome geometrical figure in relation to which they are always conſidered, as triangular numbers, pentagonal numbers, pyramidal numbers, *&c.*

FIGURATIVE, among grammarians, is the

Fig. 1. FIGURE.

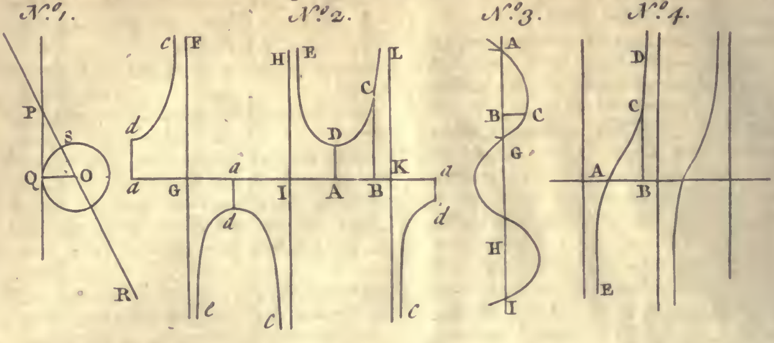


Fig. 2. FLORY.

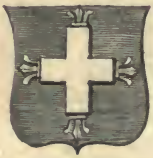


Fig. 3. FITCHEE.

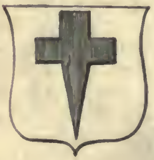


Fig. 4. FLEAM.

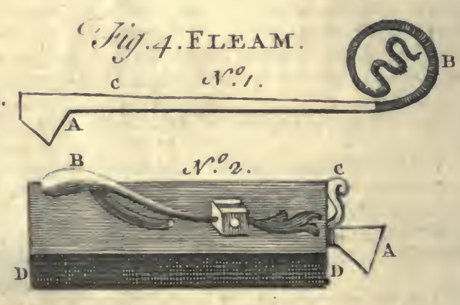


Fig. 5. FLEXURE.

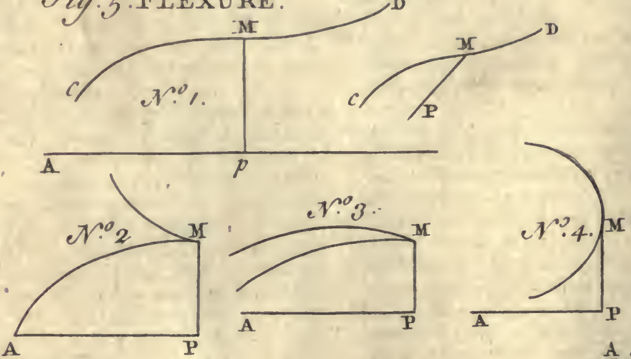
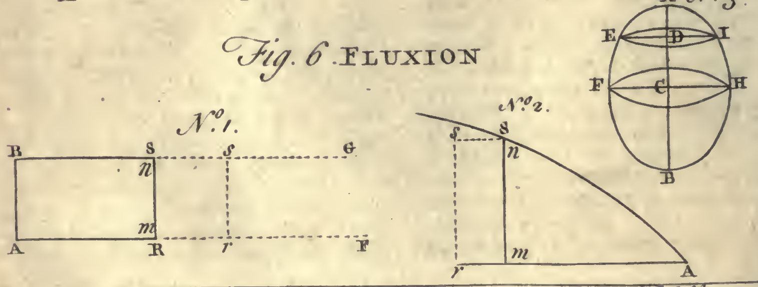


Fig. 6. FLUXION



T. Jefferys sculp

the ſame with what is otherwiſe called characteriſtic. See CHARACTERISTIC.

FIGURATIVE COUNTERPOINT, in muſic, is that wherein there is a mixture of diſcords along with the concords. See the article COUNTERPOINT.

The French call it ſuppoſition, becauſe the tranſient diſcords ſuppoſe a concord immediately following. See the article SUPPOSITION.

FIGURATIVE DESCANT, in muſic. See the article DESCANT.

FIGURE, in phyſics, expreſſes the ſurface or terminating extremities of any body; and conſidered as a property of body affecting our ſenſes, is defined a quality which may be perceived by two of the outward ſenſes. Thus a table is known to be ſquare by the ſight, and by the touch. The ſchoolmen therefore diſpute whether or no the quality of figure be the ſame with that of form. Boethius affirms, that figure ought to be predicated of inanimate bodies, and form of animate: others again extend form to all natural bodies, and figure to all artificial ones: in the opinion of others, form and figure are applied to all ſorts of bodies, but not in all relations. If only the bare circumference or circumſcription be conſidered, they call it figure; but if the circumference be conſidered as endued with colour, then they call it form. See the article FORM.

FIGURES, in arithmetic, are certain characters whereby we denote any number which may be expreſſed by any combination of the nine digits, &c. See the article DIGIT.

FIGURE, in architecture, and ſculpture ſignifies the repreſentation of things made in ſolid matter, as ſtatues, &c. Daviler obſerves, that thoſe repreſentations of human bodies ſitting, as popes, or kneeling, as on monuments, or lying as river-gods, &c. are more properly called figures than ſtatues.

FIGURE, in aſtrology, a deſcription of the diſpoſition of the heavens at a certain hour, in which the places of the planets and ſtars are marked in a figure of twelve triangles, called houſes. See HOUSE.

FIGURE, in conic ſections, according to Apollonius, is the rectangle made under the latus rectum and tranſverſum in the hyperbola and ellipſis.

FIGURE of the diameter; the rectangle under any diameter, and its proper parameter is, in the ellipſis and hyperbola, called the figure of that diameter.

FIGURE, among divines, is uſed for the myſteries repreſented under certain types. See the article TYPE.

FIGURE, in dancing, denotes the ſeveral ſteps which the dancer makes in order and cadence, conſidered as they mark certain figures on the floor.

FIGURE, in fortification, the plan of any fortified place, or the interior polygon, which, when the ſides and angles are equal, is called a *regular*, and when unequal, an *irregular* figure.

FIGURE, in geometry, the ſuperficies included between one or more lines, is denominated either rectilinear, curvilinear, or mixt, according as the extremities are bounded by right lines, curve lines, or both. See the articles RECTILINEAR, &c.

Equilateral FIGURE. See EQUILATERAL.

Circumſcribed FIGURE. See CIRCUMSCRIBED.

Inſcribed FIGURE. See INSCRIBED.

Similar FIGURE, &c. See SIMILAR, &c.

FIGURE, in the higher geometry, a term applied to three mechanical curves, called the figure of the ſecants, figure of the ſines, figure of the tangents.

FIGURE *of the ſecants*, is generated thus. Let P Q (plate XCVIII. fig. 1. nº 1.) be a tangent to the circle Q S O, and an infinite right line P O R revolve about the center O, cutting the circle in S, and the tangent in P: then if upon the infinite baſe, or abſciſſal line A K (ibid. nº 2.) be taken the point A, and afterwards, the abſciſs A B be taken upon the ſame always equal to the circular arch Q S, and the correſpondent ordinate B C at right angles to it, be equal to the ſecant O P of that arch, and moves along A K; by this motion the extremity C of that ordinate will deſcribe the curve E D C called the figure of the ſecants.

This curve conſiſts of an infinite number of ſuch parts, of which E D C is one; having an infinite number of parallel aſymptotes F G, H I, L K, drawn at diſtances from one another, each equal to half the circumference of the circle Q S O, which parts alternately fall below and above the abſciſſal line A K; the leaſt ordinates being *a d*, or AD, each equal to the radius Q O of the circle. The quadrature of the ſpace A D C B will give the meridional parts for a given latitude in Mercator's chart. See the article MERIDIONAL PARTS.

FIGURE *of the ſines*, is generated much after the ſame manner as the figure of the ſecants, the difference being only that here every ordinate B C (ibid. n° 3.) anſwerable to the abſciſs A B, is the ſine of the correſpondent arch Q S of the circle (ſee the former figure) inſtead of being its ſecant, as O P. This curve conſiſts of an infinite number of parts, ſuch as A C G, alternately riſing above and falling below the abſciſſal line A I, which in reality make but one continued infinite ſerpentine line. Any ſpace A B C of this curve is ſquarable. See farther in Philoſ. Tranſ. n° 337.

Figure *of the tangents* is generated like the figure of the ſecants, with this difference, that the ordinate BC (ibid. no 4.) is here equal to the tangent QP of the arch QS, to which the abſciſs AB is equal; the curve conſiſting of an infinite number of ſuch parts, of which E A D is one, and having a like number of parallel aſymptotes at equal diſtances from each other.

Figure, in grammar, a deviation from the natural rules of etymology, ſyntax and proſody, either for brevity, elegance or harmony.

Figure in etymology, or figure of words, is generally called metaplaſmus. See the article Metaplasmus.

Figures in ſyntax, or figures of ſentences, are reduced to four kinds, *viz.* Ellipſis, pleonaſmus, enallage, and hyperbaton; and the figures in proſody are theſe ſix, ſynalæpha, ecthlipſis, ſynæreſis, diæreſis, ſyſtole and diaſtole. See each of theſe under its proper head.

Figure, in heraldry, a bearing in a ſhield repreſenting a human face, as a ſun, a wind, an angel, *&c.*

Figure, in logic, denotes a certain order and diſpoſition of the middle term in any ſyllogiſm.

Figures are fourfold, 1. When the middle term is the ſubject of the major propoſition, and the predicate of the minor, we have what is called the firſt figure. 2. When the middle term is the predicate of both the premiſſes, the ſyllogiſm is ſaid to be in the ſecond figure. 3. If the middle term is the ſubject of the two premiſſes, the ſyllogiſm is in the third figure; and laſtly, by making it the predicate of the major, and ſubject of the minor, we obtain ſyllogiſms in the fourth figure. Each of theſe figures has a determinate number of moods, including all the poſſible ways in which propoſitions differing in quantity or quality can be combined, according to any diſpoſition of the middle term, in order to arrive at a juſt concluſion. See the article Mood.

Figure, in painting and deſigning, denotes the lines and colours which form the repreſentation of any animal, but more particularly, of a human perſonage. Thus a painting is ſaid to be full of figures, when there are abundance of repreſentations of men; and a landſcape is ſaid to be without figures, when there is nothing but trees, plants, mountains, *&c.*

Figure, in rhetoric, is a manner of ſpeaking different from the ordinary and plain way, and more emphatical; expreſſing a paſſion, or containing a beauty.

Figures, therefore, are highly ſerviceable to clear difficult truths, to make a ſtyle pleaſant and pathetical, and to awaken and fix attention. But as, in order to obtain theſe ends, they are to be uſed with prudence and caution, the following directions ought to be obſerved. 1. Let the diſcourſe always be founded on nature and ſenſe, ſupported with ſtrong reaſon and proof, and then add the ornaments and heightenings of figures; for a man of clear underſtanding will deſpiſe the flouriſh of figures without ſenſe, and pomp of words that wants truth and ſubſtance of things. 2. Be ſparing in the uſe of figures. A paſſion deſcribed in a multitude of words, and carried on to a diſproportionate length, fails of the end propoſed, and tires inſtead of pleaſing. 3. Figures muſt not be over adorned, nor affectedly laboured, and ranged into new and ſcrupulous periods; for by affectation and ſhew of art, the orator betrays and expoſes himſelf, and it is apparent, that he is rather ambitious to ſet off his parts and wit, than to expreſs his ſincere concern and paſſion.

The principal and moſt moving figures are exclamation, doubting, correction, omiſſion, apoſtrophe, ſuſpenſion, prevention, conceſſion, repetition, periphraſis, exaggeration, climax, compariſon, proſopopœia, tranſition, ſentence, epiphonema, *&c.* See each of theſe under its proper head.

FIGURED, in general, ſomething marked with figures. See the article Figure.

The term figured is chiefly applied to ſtuffs, whereon the figures of flowers, and the like are either wrought, or ſtamped. See the articles Stuff, Weaving, Velvet, *&c.*

Figured stones, in natural hiſtory,

thoſe found in the ſhape of ſhells, or other parts of animals. See STONE.

FILACER, or FILAZER. See FILAZER.

FILAMENT, in phyſiology and anatomy, denotes much the ſame as fibre. See the article FIBRE.

FILAMENTS, among botaniſts, is particularly uſed for the ſtamina. See STAMINA.

FILANDERS, in falconry, a diſeaſe in hawks, *&c.* conſiſting of filaments, or ſtrings of blood, coagulated; and occaſioned by a violent rupture of ſome vein, by which the blood, extravaſating, hardens into theſe figures, and incommodes the reins, hips, *&c.*

FILANDERS are alſo worms as ſmall as thread, and about an inch long, that lie wrapt up in a thin ſkin, or net, near the reins of an hawk, apart from either gut or gorge.

This malady is known by the hawk's poverty; by ruffling her tail; by her ſtraining the fiſt, or perch, with her pounces; and laſtly, by croaking in the night, when the filanders prick her. The diſeaſe proceeds from bad food, and muſt be remedied in time, to prevent its ſpreading over the whole body, and deſtroying the bird. Theſe muſt not be killed as other worms are, for fear of impoſthumes from their corruption, being incapable of paſſing away with the hawk's meat. They muſt only be ſtupified, to prevent their being offenſive; and this is done by giving the hawk a clove of garlic, after which, ſhe will feel nothing of the filanders for forty days. It will be prudent in the falconer when he obſerves the hawk poor and low, to give her a clove of garlic once a month by way of prevention.

FILAZER, or FILACER, an officer of the Common-Pleas, ſo called from his filing thoſe writs whereon he makes out proceſs.

There are fourteen of theſe officers, who are ſeverally allotted to particular diviſions and counties, and make out all writs and proceſſes upon original writs, iſſuing out of the court of Chancery, and returnable in that court. They likewiſe make out all appearances and ſpecial bails, upon any proceſs iſſued by them, and make the firſt fieri facias on ſpecial bails, writs of habeas corpus, ſuperſedeas upon ſpecial bail; alſo writs of view in real actions, *&c.*

FILBERT, or FILBERD, the fruit of the corylus, or hazel. See CORYLUS. This is the leaſt ſort of ſmall nuts, and more nouriſhing than the common nuts; but it is hard to digeſt. They are however worthy of being propagated in orchards and gardens; which is done by ſowing them in February.

In order to preſerve them good, they ſhould be kept in ſand, in a moiſt cellar, where the vermin cannot come at them to deſtroy them: the external air ſhould not be kept from them, for this would occaſion their turning mouldy.

FILE, among mechanics, a tool uſed in metal, *&c.* in order to ſmooth, poliſh, or cut.

This inſtrument is of iron, or forged ſteel, cut in little furrows, with chiſſels, and a mallet, this and that way, and of this or that depth, according to the grain or touch required. After cutting the file, it muſt be tempered with a compoſition of chimney ſoot, very hard and dry, diluted, and wrought up with urine, vinegar, and ſalt; the whole being reduced to the conſiſtence of muſtard. Tempering the files conſiſts in rubbing them over with this compoſition, and covering them in loam; after which they are put in a charcoal fire, and taken out by that time they have acquired a cherry colour, which is known by a ſmall rod of the ſame ſteel put in along with them. Being taken out of the fire, they are thrown into cold ſpring water, and when cold, they are cleaned with charcoal and a rag; and being clean and dry, are kept from ruſt by laying them up in wheat bran. Iron files require more heating than ſteel ones. Files are of different forms, ſizes, cuts and degrees of fineneſs, according to the different uſes and occaſions for which they are made. Thoſe in common uſe are the ſquare, flat, three ſquare, half round, round, thin file, *&c.* each of which may be of different ſizes, as well as different cuts.

The rough or coarſe toothed files are to take off the unevenneſs of the work which the hammer made in the forging; and the fine toothed files are to take out of the work the deep cuts or file-ſtrokes of the rough files: the files ſucceed one another in this order, firſt the rubber, then the baſtard toothed file, next the fine toothed file, and laſtly, the ſmooth file. Thus the files of different cuts ſucceed one another, till the work is ſo ſmooth, as it can be filed. After which, it may be made ſtill ſmoother, by emery, tripoli, *&c.* See POLISHING.

In uſing all ſorts of files, the rule is to lean heavy on the file in thruſting it forward, becauſe the teeth of the files are made to cut forward; but in drawing the file back again for a ſecond ſtroke, it is to be lightly lifted, juſt above the work, by reaſon it does not cut in coming back.

The file is uſed in pharmacy to reduce hard ſubſtances to fine particles, whoſe conſiſtence will not admit of powdering.

Files, the gros, containing twelve dozen, pay on importation 7s. $8\frac{40}{100}$d. and on exportation draw back 6s. 9d. Moreover, for every 112 ℔. of the iron, the duty is 4s. $8\frac{25}{100}$d. and on exportation the draw back is 4s. $8\frac{25}{100}$d.

FILE, or LABEL, in heraldry. See LABEL.

FILE, in the art of war, a row of ſoldiers, ſtanding one behind another, which is the depth of the battalion, or ſquadron. The files of a battalion of foot are generally three deep; as are ſometimes thoſe of a ſquadron of horſe. The files muſt be ſtraight, and parallel one to another.

To double the FILES, is to put two files into one, which make the depth of the battalion double of what it was in number of men.

The FILE *leaders*, are the foremoſt men in each file; the bringers up are the laſt men of each file, or the laſt rank of the battalion.

To FILE OFF, is the ſame as to defile, or to file off from a large front to march in length. See the article DEFILE.

FILICULA, the DWARF-FERN. See the article FILIX.

FILIGRANE, or FILIGREE WORK, any piece of gold or ſilver-work, that is curiouſly done, with grains or drops on the filaments or threads.

FILING, in ſmithery, the operation of faſhioning metalline bodies by means of a file. See the article FILE.

FILIPENDULA, DROPWORT, a genus of the icoſandria-pentagynia claſs of plants, the corolla of which conſiſts of five, or more, oblong, obtuſe, plane, patent petals, inſerted into the calyx: there is no pericarpium, except the cruſts of the ſeed; the receptacle is globoſe: the ſeeds are oblong, acuminated, and diſpoſed in a circular manner.

This plant is a diuretic: it is recommended againſt colics, flatulencies, and the fluor albus: but its chief uſe conſiſts in ſtopping too great a flow of the lochia.

FILIX, in botany, an order of the cryptogamia claſs of plants, comprehending the fern, horſe-tail, adder's tongue, maidenhair, ſpleenwort, polypody, *&c.* See the articles FERN, *&c.*

FILLET, in anatomy, the ſame with frænum. See the article FRÆNUM.

FILLET, or FILET, in architecture, a little ſquare member, ornament, or moulding, uſed in divers places, and upon divers occaſions, but generally as a crowning over a greater moulding.

FILLET, in heraldry, a kind of orle or bordure, containing only a third or fourth part of the breadth of the common bordure. It is ſuppoſed to be withdrawn inwards, and is of a different colour from the field. It runs quite round, near the edge, as a lace over a cloak. It is alſo uſed for an ordinary drawn like a bar, from the ſiniſter point of the chief, acroſs the ſhield, in manner of a ſcarf; though it ſometimes is alſo ſeen in the ſituation of a bend, feſſe, croſs, *&c.*

According to Guillim, the fillet is a fourth part of the chief, and is placed in the chief point of the eſcutcheon.

FILLET, in painting, gilding, *&c.* is a little rule or reglet of leaf-gold, drawn over ſome mouldings, or on the edges of frames, pannels, *&c.* eſpecially when painted white, by way of enrichment.

FILLET, in the manege, the loins of an horſe, which begin at the place where the hinder part of the ſaddle reſts.

FILLER-HORSE, one yoked immediately to a cart. See the article CART.

FILLY, a term among horſe-dealers, to denote the female or mare colt. See the article FOAL.

FILM, a thin ſkin or pellicle. In plants, it is uſed for that thin, woody ſkin, which ſeparates the ſeeds in the pods, and keeps them apart.

White FILM *upon the eye of a horſe*, may be removed by lifting up the eye-lid, after the eye has been waſhed with wine, and ſtroaking it gently, with one's thumb, with wheat flour; alſo common ſalt, or ſalt of lead, beaten fine, and put into the eye, is proper to conſume a film: or you may waſh the horſe's eye with your ſpittle in the morning, faſting, having firſt put a little ſalt into your mouth: but there is nothing ſo effectual as ſal armoniac, beaten and put into the eye, and repeated every day till the film is gone.

FILTER, or Filtre, in chemiſtry, a ſtrainer commonly made of bibulous or filtering paper in the form of a funnel, through which any fluid is paſſed, in order to ſeparate the groſs particles from it, and render it limpid. See the article Clarification.

There are ſeveral filters made of flannel and linen-cloth.

FILTRATION, in chemſtry, a ſpecies of clarification. See Clarification.

FIMBRIÆ, denotes appendages diſpoſed by way of fringe round the border of any thing: ſuch are thoſe about the thicker extremities of the fallopian tubes. See the article Fallopian.

FIMBRIATED, in heraldry, an ordinary with a narrow bordure or hem of another tincture.

This, in latin, is called *fimbriatus*, that is, edged or fringed.

FIN, *pinna*, in natural hiſtory, a well known part of fiſhes, conſiſting of a membrane ſupported by rays, or little bony or cartilaginous oſſicles.

The number, ſituation, and figure of fins, are different in different fiſhes. As to number, they are found from one to ten, or more; with reſpect to ſituation, they ſtand either on the back only, the belly only, or on both; and as to figure, they are either of a triangular, roundiſh, or oblong ſquare form. Add to this, that in ſome they are very ſmall; whereas, in others, they almoſt equal the whole body in length.

For the uſe of the fins in ſwimming, See the article Swimming.

Whale Fins. See the article Whale.

FINAL, in general, whatever terminates or concludes a thing.

Final cause. See the article Cause.

Final letters, among hebrew grammarians, five letters ſo called, becauſe they have a different figure at the end of words from what they have in any other ſituation. Theſe are caph, mem, nun, phe, tzade, all comprehended in the word *camnephatz*; which, at the end of words, are written thus, ךםןףץ; whereas, in any other ſituation, their form is thus, כמנפצ, on which account they are likewiſe called biform.

Final, in geography, a port town of Italy, ſubject to Genoa, and ſituated on the Mediterranean, about thirty-ſeven miles ſouth-weſt of that city.

FINANCES, in the french polity, ſignify the revenues of the king and ſtate.

FINCH-kind, in ornithology, an appellation given to a genus of birds, known among authors by the name of fringilla, See the article Fringilla.

FINE, in law, has divers ſignifications, it being ſometimes taken for a ſum of money advanced and paid for the income of lands. It is likewiſe uſed in another ſenſe, where a ſum is paid as an amends, or by way of puniſhment for an offence committed.

Fine denotes alſo a covenant made before juſtices, and entered upon record, for conveyance of lands and other inheritable things, in order to cut off all controverſies. As this fine is a concord acknowledged before a competent judge concerning lands, tenements, and other immoveable things, and for its better credit, is ſuppoſed to be made in the preſence of the king, as it is levied in his court; it therefore binds women covert, who are parties, and others whom the law generally diſables to act; for this reaſon, becauſe all preſumption of deceit is excluded, where the king and his court of juſtice are deemed privy to the matter tranſacted. Fines, on account of their ſolemnity, are acknowledged in the court of common pleas. Juſtices of aſſiſe may alſo take them, though they ſeldom do it without a ſpecial dedimus poteſtatem, by virtue of which writ, fines may be alſo taken by commiſſioners in the country, and the dedimus ſurmiſes that parties are not able to travel to Weſtminſter; for by the common law, all fines are levied in court.

In every fine there are five parts, 1. An original writ, generally termed a writ of covenant. 2. The licentia concordandi, or the king's licence, for which a fine, called the king's ſilver, is paid. 3. The concord, which contains the agreement between the parties in what manner the land ſhall paſs, and is the foundation and ſubſtance of the fine. 4. The note of the fine, or abſtract of the original contract. 5. The foot of the fine containing the day, year and place, and before what juſtices the contract was made.

There are four ſorts of fines. 1. *A fine ſur cognizance de droit comme ceo*, &c. which is the principal and ſureſt kind of fine, as it gives poſſeſſion, at leaſt in law, to the cognizee, without any writ of execution. 2. *A fine ſur done, grant & render*, or double fine, whereby the cognizee, after a releaſe and warrant to him by the cognizor, grants and renders back the lands, &c. or ſome rent, many times limiting remainders.' 3. *A fine ſur cognizance de droit tantum*, and this is a fine executory, that is commonly uſed to paſs a reverſion, and ſometimes by tenant for life to releaſe to the perſon in reverſion. 4. *A fine ſur conceſſit*, which is made uſe of to grant away eſtates for life or years, and it is alſo executory; ſo that the cognizee muſt enter or have a writ of habere facias poſſeſſionem, to obtain poſſeſſion.

Fines are either with proclamation, called fines according to the ſtatutes, or without proclamation, called fines at common law. The ſtatutes ordain, that every fine ſhall be openly read and proclaimed in the common pleas, and a tranſcript of it ſent to the juſtices of the aſſiſe, and another to the juſtices of the peace of the county where the land lies, in order to be proclaimed there; and when this is certified, privies in blood, as the heirs of the cognizor, are preſently barred, but ſtrangers to the fine have five years allowed them to enter and claim their right. The like time is given to infants, after they come to full age; to feme-coverts, not joining in fines after the death of their huſbands; to priſoners, after they are ſet at liberty; and to perſons out of the realm, after their return.

FINE ADNULLANDO LEVATO DE TENEMENTO QUOD FUIT DE ANTIQUO DOMINICO, is a writ directed to the common pleas to diſannul a fine levied of lands in antient demeſne, to the prejudice of the lord.

FINE *for alienation*, was a fine paid to the king by his tenants in chief, for a licence to alien their lands. Theſe fines are taken away by 12 Car. II. cap. 24.

FINE CAPIENDO PRO TERRIS, is a writ that lies where a perſon upon conviction of an offence by jury, having his lands and goods taken into the king's hands, and his body committed to priſon, obtains the favour to be remitted his impriſonment, and his lands and goods to be reſtored to him for a ſum of money.

FINE FORCE, is an expreſſion in the ſtatute 35 Henry VIII. c. 12. denoting that a perſon is forced to do that which he can no way avoid.

FINE NON CAPIENDO PRO PULCHRE PLACITANDO, is a writ to hinder officers of courts from taking fines for fair pleading.

FINE PRO REDISSEISINA CAPIENDA, is a writ which lies for the releaſe of a perſon impriſoned for a rediſſeiſin, upon paying a reaſonable fine.

FINES *for writs*, are paid in divers caſes for original writs. Thus for every writ of plea of land, if it be not of right patent, which is for the yearly value of five marks; and all original writs in debt and treſpaſs, where the debt or damage is 40 l. a fine is due to the king of 6 s. 8 d. and more proportionably when any writ is for things of greater value.

FINEERING, or **VENEERING**. See **VENEERING**.

FINERS *of gold and ſilver*, are thoſe who ſeparate theſe metals from coarſer ores.

FINERY, in the iron-works, one of the forges at which the iron is hammered and faſhioned into what they call a bloom, or ſquare bar. See the article **IRON**.

FINGERS, *digiti*, in anatomy, the extreme part of the hand divided into five members. See the article **HAND**.

The names of the fingers, reckoning from the thumb, are, 1. Pollex. 2. Index. 3. Medius. 4. Annularis. 5. Auricularis. In each of theſe there are three bones, which make three phalanges, the upper of which are much larger than the lower. Their exterior ſurface is gibbous, or convex, and their interior is plane, but ſomewhat hollowed, for the convenience of ſeizing and laying hold of things. The firſt phalanx, in the part where they are articulated with the bones of the metacarpus at their heads, have a glenoide cavity, by means of which articulation, they have a free motion every way. In the other extremity, there are two heads with two cavities joined to the ſecond phalanx, where the motions of flexion and extenſion are all that are poſſible; and the ſame is the caſe between the ſecond phalanx and the third. In the upper extremities of the bones of the ſecond and third phalanx, there is to be obſerved an eminence placed between two cavities: this has the ſame uſe with the olecranum. The fartheſt extremity of the laſt phalanx, has a point or apex ſomewhat broader than the body. See the articles **PHALANX** and **THUMB**.

The muſcles of the fingers are in part common and in part proper. The common are the flexors of the firſt, ſecond, and third phalanx, the extenſor and interoſſei. See the articles **EXTENSOR** and **INTEROSSEUS**.

Of the proper muſcles of the fingers, thoſe belonging to the thumb are five, *viz.* flexor, extenſor, thenar, hypothenar, and antithenar. The proper muſcles of the index and auricularis, are two in each, *viz.* an extenſor and an abductor. See the articles FLEXOR, EXTENSOR, THENAR, &c.

Superfluous FINGERS. Infants are often born with ſuperfluous, or ſupra-numerary fingers, which are uſually miſhapen and miſplaced: ſome of theſe are found to have nails and bones like other fingers; others have nothing of this, but are mere maſſes of fleſh. Heiſter is of opinion, that theſe ſhould always be amputated in the infancy of the child, but if they are many in number, and the child but weakly, it may be better not to take them all off at one time, but to ſtay ſome time between each amputation, that one may be near well, before another is taken off. They are to be cut off with the ſcalpel or ſciſſars, and the hæmorrhage ſtopped either with dry lint, or with the ſame dipped in ſpirit of wine, and afterwards healed, as common wounds, with vulnerary balſams.

Carious FINGERS. The fingers, when carious or affected by a ſpina ventoſa, are, according to Heiſter, to be amputated three ways. 1. By a pair of ſtrong ſciſſars, or ſharp edged pincers. 2. By a chizzel ſtruck by a leaden mallet, by which they are ſeparated at one blow: or laſtly, by dividing the next ſound joint with a ſcalpel, and drawing back a part of the ſkin to wrap over the ſtump, that it may heal the ſooner; and this is the beſt method of all, as by this you are in no fear about any ſplinters of the bone being left.

Fractured FINGERS. When one or more of the bones in the fingers are broke, the ſurgeon's buſineſs is carefully to replace what has been removed, and to roll up the finger a little way with a narrow bandage, and then to bind it firmly to the next ſound finger. But it is much more proper, when the finger is maſhed, ſo as to give no hope of a good cure, to take it off at once. See FRACTURE.

Luxated FINGERS. The bones of the fingers and thumbs are liable to luxations of each of their articulations, and that in ſeveral directions; but theſe are accidents not only eaſily diſcovered, but very eaſily remedied alſo; for the ligaments being not very robuſt, the fat and muſcles thin, and the ſinuſes of the articulations ſhallow, the extenſion is very eaſy, and the reduction of them into their former places not leſs ſo. The beſt method is to extend ſufficiently the finger with one hand, and to replace the luxated bone at the ſame time with the other, and to retain it ſo by a proper bandage.

FINING, or REFINING. See the articles CLARIFICATION and REFINING.

FINING *of wines*. See the article WINE.

FINISHING, in architecture, is frequently uſed for a crowning, acroter, &c. raiſed over a piece of building, to terminate, complete, or finiſh it. See the article CROWNING.

FINISTERRA, the moſt weſterly cape or promontory of Spain, in 10° 15′ weſt long. and 43° north lat.

This cape is likewiſe the moſt weſterly part of the continent of Europe.

FINITE, ſomething bounded or limited, in contradiſtinction to infinite. See the article INFINITE.

The ſchools diſtinguiſh finite into two kinds, *viz.* finite in perfection, and finite in extenſion. See PERFECTION and EXTENSION.

Finite in perfection, is applied to things which have not all poſſible perfection, but ſuch only as may be comprehended by the mind. Thus the world, though ſuppoſed by the Carteſians infinite in point of extenſion, is yet finite in eſſence or perfection. In order to arrive at an idea of a thing finite in perfection, we muſt firſt conceive the thing as having certain perfections, and then conceive ſome other perfections which it has not; or ſome perfections in a greater degree. Thus when I ſay, that there is a finite number, I firſt conceive a number conſiſting of three units, then conceive other units beyond theſe three. I conceive my mind to be finite, by obſerving certain perfections beyond thoſe I find in my mind.

Finite in extenſion, is applied to things which have not all poſſible or conceivable extenſion. To arrive at an idea of a thing finite in extenſion, we muſt firſt conceive the thing as having a certain extenſion, and then conceive ſome other extenſion which it has not; thus I conceive a room to be finite in extenſion, by having an idea of extenſion beyond what is contained therein.

FINITO, in muſic; a canon or fugue is ſaid to be finito, when it is not perpetual, but when, at ſome certain place, all the parts join or unite, after having followed one another for ſome time.

FINITOR, in aſtronomy, the ſame with horizon, ſo called becauſe it terminates the ſight or proſpect. See HORIZON.

FINLAND, a province of Sweden, lying northward of the gulph of Finland, and eaſtward of the Bothnic gulph. It is a frontier province, bounded by Ruſſia on the eaſt.

FINNIKIN, the engliſh name of a ſpecies of pigeon, remarkable for its wheeling round ſeveral times, whenever it courts the female.

FINNOCHIA, SWEET-FENNEL, in botany, a ſpecies of fennel, cultivated in gardens as a ſallad-herb, and as ſuch much liked by ſome.

FINTO, in muſic, a feint or an attempt to do ſomething and not to do it; as cadenza finto is, when having done every thing proper for a true cadence, inſtead of falling on the right final, another note, either higher or lower, is taken or perhaps a pauſe brought in.

FIR-TREE, *abies*, in botany. See the article ABIES.

Scotch FIR, a name given to the mountain-pine. See the article PINE.

FIRE, *ignis*, in phyſiology, according to Boerhaave, is ſomething unknown, which has the property of penetrating all ſolid and fluid bodies, and dilating them ſo as to take up more ſpace.

The moſt univerſal and ſenſible character of fire, and that which beſt diſtinguiſhes it from every other thing, is its giving heat: whence fire may be generally defined, to be whatever warms or heats bodies. However, by the general name of fire, men ſeem to underſtand a ſenſation or complex notion of light, heat, burning, melting, *&c.*

Nature of FIRE. The doctrine of fire, as laid down by modern philoſophers, is very different. The great and fundamental difference in reſpect to the nature of fire is, whether it be originally ſuch, formed thus by the creator himſelf at the beginning of things, or whether it be mechanically producible from other bodies, by inducing ſome alterations in the particles thereof. The former opinion is maintained by Homberg, Boerhaave, the younger Lemery, and s'Graveſande; the latter is chiefly ſupported by the engliſh philoſophers, lord Bacon, Mr. Boyle, and Sir Iſaac Newton.

Bacon, in his treatiſe De Forma Calidi, deduces from a great number of particulars, that heat in bodies is no other than motion; only a motion ſo and ſo circumſtantiated: ſo that to produce heat in a body, nothing is required but to excite a certain motion in the parts thereof. Boyle ſeconds him in an expreſs treatiſe of the mechanical origin of heat and cold, and maintains the ſame doctrine with new obſervations and experiments; as a ſpecimen whereof, we ſhall here give the two following.

1. In the production, ſays he, of heat, there appears nothing on the part either of the agent or patient, but motion and its natural effects. When a ſmith briſkly hammers a ſmall piece of iron, the metal thereby becomes exceedingly hot; yet there is nothing to make it ſo, except the forcible motion of the hammer impreſſing a vehement and variouſly determined agitation of the ſmall parts of the iron, which, being a cold body before, grows, by that ſuper-induced commotion of its ſmall parts, hot: firſt, in a more looſe acceptation of the word, with regard to ſome other bodies, compared with which it was cold before: then, ſenſibly hot; becauſe this agitation ſurpaſſes that of the points of our fingers; that in this inſtance oftentimes the hammer and anvil continue cold, after the operation: which ſhews that the heat acquired by the iron, was not communicated by either of thoſe implements, as heat; but produced in it by a motion, great enough ſtrongly to agitate the parts of ſo ſmall a body as the piece of iron, without being able to have the like effect upon ſo much greater maſſes of metal as the hammer and the anvil. Though if the percuſſions were often and briſkly renewed, and the hammer were ſmall, this alſo might be heated; whence it is not neceſſary, that a body itſelf be hot to give heat.

2. If a large nail be driven by a hammer into a plank of wood, it will receive ſeveral ſtrokes on its head, before it grow hot: but when it is once driven to the head, a few ſtrokes ſuffice to give it a conſiderable heat; for while, at every blow of the hammer, the nail enters further into the wood, the motion produced is chiefly progreſſive, and is of the whole nail tending one way; but when that motion ceaſes, the impulſe given by the ſtroke being unable to drive the nail further on, or break it, muſt be ſpent in making a various, vehement, and inteſtine commotion of the parts among themſelves, wherein the nature of heat conſiſts.

Agreeable to this is the opinion of Sir Iſaac Newton, who conceives that groſs bodies may be converted into light, by the agitation of their particles; and light, again, into groſs bodies, by being fixed therein.

On the other hand, M. Homberg, in his Eſſai du Souffre Principe, holds that the chemical principle, or element ſulphur, which is ſuppoſed one of the ſimple, primary, pre-exiſtent ingredients of all natural bodies, is real fire, and conſequently that fire is coeval with bodies.

Dr. s'Graveſande goes on much the ſame principle: fire, according to him, enters the compoſition of all bodies, is contained in all bodies, and may be ſeparated or procured from all bodies, by rubbing them againſt each other; and thus putting their fire in motion: but fire, he adds, is by no means generated by ſuch motion.

Mr. Lemery, the younger, agrees with theſe two authors in aſſerting this abſolute and ingenerable nature of fire: but he extends it farther. Not contented to confine it as an element to bodies, he endeavours to ſhew, that it is equally diffuſed through all ſpace, and that it is preſent in all places; in the void ſpaces between bodies, as well as in the inſenſible interſtices between their parts.

This laſt ſentiment falls in with that of Boerhaave, and the celebrated M. Muſſchenbroek. But notwithſtanding it is evident that fire, heat, flame, *&c.* are only the different modifications of the particles of light, and that the particles of light themſelves depend entirely on velocity for their lucific quality; ſince, by many experiments, we know, that the particles of bodies become lucid, or particles of light, by only producing in them a requiſite degree of velocity: thus the particles in a rod of iron, being hammered very nimbly, ſhine and become red hot: thus, alſo, the violent ſtroke of the flint againſt the ſteel, in ſtriking fire puts the particles of the ſteel, which it takes off, in ſuch a motion as cauſes them to melt and become red hot, which makes the ſparks of fire produced by each ſtroke. As, therefore, fire conſiſts in the great velocity of the particles, ſo it may be communicated from one body in which it is, to another in which it is not, after the ſame manner that one body in motion will communicate motion to another that has got none.

Fire differs from heat only in this, that heat is a motion in the particles of a body, with a leſſer degree of velocity; and fire a motion with a greater degree of velocity, *viz.* ſuch as is ſufficient to make the particles ſhine; though we often call ſuch a ſtate as will burn, fire, though it does not actually ſhine; and we ſeldom call thoſe lucid bodies fires, which only ſhine, and do not burn. Theſe are a ſort of phoſphori, which, though they have no heat, yet ſeem to owe their lucidity to the motion of their parts. See the articles HEAT and PHOSPHORUS.

There ſeems to be no other difference between fire and flame, than this; that fire conſiſts in a glowing degree of velocity in the parts of a body, while yet ſubſiſting together in the maſs; but flame is the ſame degree of velocity in the particles diſſipated and flying off in vapour: or, to uſe Sir Iſaac Newton's expreſſion, flame is nothing elſe but a red hot vapour. See the article FLAME.

General diviſion of FIRE. Fire, in general, is divided into three kinds or ſpecies, *viz.* celeſtial, ſubterraneous, and culinary.

By celeſtial fire we principally mean that of the ſun, without regard to the fire of the fixed ſtars, though this, perhaps, may be of the ſame nature. By ſubterraneous fire, we underſtand that which manifeſts itſelf in fiery eruptions of the earth, vulcanoes, or burning mountains; and by any other effects it produces in mines, or the more central parts of the earth. By culinary fire, we mean that commonly employed in all chemical operations in the animal, vegetable, atmoſpherical, marine, and mineral kingdoms. Conſidered in itſelf, fire ſeems to exiſt in greateſt purity and perfection in the celeſtial regions; at leaſt we are inſenſible of any conſiderable ſmoke it yields; for the rays of light come to us from the ſun unmixed with any of that groſs, feculent, or terreſtrial matter found in culinary and ſubterraneous fires. And allowing for this difference, the effects of the ſolar fire appear the ſame as thoſe of the culinary fire. To examine alſo the effects of ſubterraneous fires, we ſhall find them the ſame with thoſe produced by the culinary fire. And thus all the three kinds of fires agree in giving the motion of rarefaction to bodies. All ſubterraneous and culinary fires require ſome pabulum or fuel, wherein it reſides, or is collected; but whether the ſame is required for the ſubſiſtence of the celeſtial fire, is more than we know. See the article FUEL.

Sir Iſaac Newton is of opinion, that the fire of the ſun and fixed ſtars, is conſerved by the greatneſs of theſe bodies, and the mutual action and re-action between them and the light which they emit; that their parts are kept from fuming away, not only by their fixity, but by the vaſt weight and denſity of the atmoſpheres incumbent upon them, and very ſtrongly compreſſing them, and condenſing the vapours and exhalations which ariſe from them.

Effects and properties of FIRE. So great is the power, ſo extenſive the action, and ſo wonderful the manner wherein fire acts, that it was antiently held and adored as the ſupreme god, by a nation reputed the wiſeſt of all others. Thus ſome of the chemiſts, having found its extraordinary force, took it for an uncreated being; and many of the moſt eminent among them, attributing all the knowledge they had acquired to this inſtrument, called themſelves philoſophers of fire, as thinking they could not be dignified by a higher title.

Fire, in effect, is the univerſal inſtrument of all the motion and action in the univerſe: without fire, all bodies would become immoveable; whence fire is the univerſal cauſe of all motion or change. The effects of fire in burning, conſiſts in this, that the velocity of the particles of fire ſo far increaſes the velocity of the parts of the body to which it is applied, as to cauſe a ſeparation beyond the ſphere of corpuſcular attraction; by which means the body will be diſſolved, and the particles, which are volatile, will fly off in the form of ſteam, ſmoke, fume, &c. while that which remains appears in the form of coal, calx, aſhes, caput mortuum, &c.

The parts of ſome bodies are extremely volatile, and will moſt of them be diſſipated by the action of fire: but others, again, are to be found whoſe parts are of ſuch a nature, or ſo fixed, as not to yield to the force of fire, or the velocity communicated to them will not be able to diſſolve the corpuſcular attraction; but when this glowing velocity of the parts is abated, or, in other words, when the fire in the body is extinct, the parts, and, of courſe, the whole body, appear unaltered; of which ſort of ſubſtance we have a notable inſtance in thoſe foſſils called the aſbeſtus and amianthus. See ASBESTUS and AMIANTHUS.

All the phyſical knowledge we can have of a ſubject, muſt ariſe from attending to its properties and effects; but theſe properties and effects can never be diſcovered without the help of experiments, which in phyſical enquiries are the only interpreters betwixt the ſenſes and the reaſon: whence all thoſe notions of fire ſhould be taken as precarious, that are taken from the teſtimony of the ſenſes, or the naked reaſon unaſſiſted by experiments.

We frequently find the effects of fire produced where no viſible fire appeared. Thus the fingers are eaſily burnt by an iron heated below the degree of ignition, or ſo as to be no way viſibly red; whence we find, that the eye is no judge of fire: ſo likewiſe the touch gives us no poſitive notice of any degree of fire below the natural heat of the body, or any ſo great as to deſtroy the organ. Again, the effects of fire are often produced without any manifeſt ſigns of burning, melting, &c. as in evaporations, exſiccations, &c. If this method of excluſion and rejection were purſued to its due length, we ſhould find perhaps no criterion, infallible mark, or characteriſtic of fire in general, but that of a particular motion ſtruggling among the ſmall parts of bodies, and tending to throw them off at the ſurface. And if this ſhould prove the caſe, then ſuch a motion will be the form or eſſence of fire; and which being preſent, makes fire alſo preſent; and when abſent, makes fire alſo abſent: whence to produce fire and produce this motion in bodies, will be the ſelf-ſame thing.

But from repeated experiments we learn, 1. That, in general, both ſolids and fluids manifeſt an expanſive motion upon being heated. 2. That the direct inflammable matter of fuel, is oil, or an unctuous ſubſtance. 3. That no fuel will burn or conſume, without the admiſſion of freſh air. 4. That the air which has once paſſed through burning fuel, is, of itſelf, unfit to animate fire again. And, 5. That flame exiſts only on the ſurface of fuel.

It appears a property belonging to fire, that its parts endeavour equally to diffuſe themſelves; that is, by moving every way, and conſequently tend neither more nor leſs to one point than another. If fire be collected in any body ſo as to be perceivable by our ſenſes, it removes itſelf out of the ſame by its own power, and expands every way from the center of its ſpace or body; whence we learn the proper conatus of fire, and that the receſſion of it is ſpontaneous. From this laſt property of fire, may be computed its force and quantity: for the ſtate of fire, as defined above, may be called its ſtagnation; and the powers of ſtagnating fire will then be as the ſpaces wherein it is contained; conſequently the communication of powers will be to each other as the ſpaces.

It were to be wiſhed that the proportional quantity of fire contained in a body, could be determined; but this is not ſo eaſy as at firſt ſight it may ſeem, by reaſon, that though from the diſcovered effects of fire we may eſtimate its power, we cannot eſtimate its quantity; as the augmentation of the fire, ariſing from the nearneſs of its particles, is hitherto undetermined: for ſo long as the proportion of the power of fire depending on its denſity or cloſeneſs, to that depending on the quantity thereof is unknown, ſo long we ſhall be unable to argue from the effect of fire to the quantity thereof.

Yet fire, whilſt it thus remains in a heated body, ſays Boerhaave, does not ſeem to unite with it into one corporeal concrete maſs; ſince, though greater than before, it is not found heavier. Neither does fire diminiſh any thing of the weight which the body would have had at that time, and to which cold ſhould reſtore it. Nothing of this kind appears from any experiment yet made.

It may be obſerved, that the ſame fire as applied in different quantities, firſt compounds bodies; and when raiſed to a higher pitch, decompounds them again. One and the ſame fire applied to the ſame body, with different circumſtances, will have quite different effects, and eſpecially as the air happens to be variouſly admitted during the operation; and the ſame fire, as applied in different degrees to the ſame object, has very different effects, as is found by experiments.

Fire and flame are aboliſhed or extinguiſhed by ſuffocation, or an action contrary to ventilation, as being deſtructive or preventive of that internal commotion and diſcharge of the oily particles of fuel, by means of the free air, wherein the nature of open and conſuming fire conſiſts. And hence fire and flame are quenched by water, or even by ſpirit of wine, or oil of turpentine, if a live coal or lighted candle be ſuddenly plunged therein below the ſurface of the liquor. For the degree of heat which water, ſpirit of wine, or oil of turpentine unfired, are capable of receiving, is much leſs than that of a burning coal or candle: whence the greater heat is ſubdued by the leſs, as fire quenched by boiling water.

Fire, in chemiſtry, the great inſtrument by which moſt of the operations in that art are performed.

The kind, degree, direction, &c. of fire, are things the chemiſt is principally to attend to. There are, in chemiſtry, as many kinds of fire, as there are mediums through which it may be conveyed, or fuels that afford it. For common uſe, fire is conveyed through aſhes, ſand, water, &c. or directly through the containing veſſel. Hence, fires are denominated of various kinds, as thoſe of ſand, filings of iron, and aſhes, the reverberatory fire, the ignis rotæ, or fire for fuſion, the lamp fire, the balneum mariæ, the vapour bath, and the fire of ſuppreſſion. The chemiſts alſo uſe ſeveral other kinds of heats, which may be claſſed among the fires, ſuch as inſolation, a bath of horſe-dung, a bath of the ſkins of grapes, and the heat of quick-lime.

For the balneum arenoſum, or the fires or baths of ſand, filings of iron, and aſhes, balneum mariæ, balneum vaporis, or vapour-bath, ſee Balneum.

The reverberatory fire is made in a furnace covered with a dome, that by this means the heat or flame, which has always a tendency to make its eſcape at the ſuperior parts of the furnace, may be reverberated, or beat back on the veſſel immediately expoſed to it. To expoſe a veſſel to a naked fire, or to diſtil with a naked fire, is when there is no intermediate ſubſtance between the diſtilling veſſel and the fire.

The ignis rotæ, or fire for fuſion, is when a crucible or any other veſſel containing the matter deſtined for fuſion, is ſurrounded with live-coals.

Lamp-fire, is when any matter contained in a glaſs veſſel is rendered hot by the equable heat of a lighted lamp.

Fire of ſuppreſſion, is when in order to diſtil per deſcenſum, the fire is laid above the matter, ſo that the moiſture forced from it, by means of the heat, is precipitated to the bottom of the veſſel: or when the body of the retort, or other veſſel, is covered over with fire.

Inſolation, is when any matter deſigned either to be put into fermentation or dried, is expoſed to the heat of the ſun.

The bath of horſe-dung, called alſo the horſe's belly, is when a veſſel containing any matter to be either digeſted or diſtilled,

tilled, is placed in a large heap of horſe-dung.

Bath of the ſkins of grapes, like the bath of horſe's dung, ſerves for digeſtions or diſtillations; the ſkins are to be collected after the vintage.

The heat of quick-lime moiſtened, may ſerve for ſome diſtillations.

Some differences may be found in the effects produced by theſe different fires, applied in the ſame degree. But they have not, perhaps, been noted as they deſerve. In ſeveral bodies, it is evident that dry and moiſt heats have different effects, which we may find remarkably in the common culinary operations of boiling, roaſting, baking, *&c.* And hence, when the ſame effects are required perfectly ſimilar, the ſame kinds as well as degrees of fire are to be uſed.

The pureſt fire is that of alcohol, or perfectly pure ſpirit of wine; the next in purity is that of diſtilled oils; the next, that of charcoal, or charred turf; and the impureſt, pit-coal: but all theſe have nearly the ſame effect, when received through the ſame kind of medium.

Degrees of FIRE. The laſt thing to be conſidered is, how to regulate and aſcertain the degrees of fire in chemical operations, ſo as to produce the effects required in every caſe. The common directions of chemiſts about this matter are full of uncertainty; the firſt, ſecond, third, and fourth degrees of heat, or fire, meaning no preciſe degrees, meaſured by any ſtandard: however, according to Boerhaave, they are as follows.

The firſt degree of fire is that by which nature performs the office of vegetation in plants, and whereby chemiſtry imitates or does the like: this commences from the higheſt degree of cold, which, in Fahrenheit's thermometer, is denoted by one, and ends at 80 degrees: ſince in this whole interval we find certain plants give indications of life and growth. This heat is ſuited to extracting of the native ſpirits of odoriferous vegetables with oils, as that of roſes, jeſſamin, *&c.* and again, to making the more curious inſolations, *&c.*

The ſecond degree of fire may be accounted that of the human body, in a healthy ſtate. This degree is always greater than that of the ambient air, and may be ſuppoſed to commence at the 40th degree of the thermometer, and end about the 94th. Within this compaſs animals may live and ſubſiſt, that is, if their juices be of any degree of heat within theſe bounds. This degree is adapted to vinous and acetous fermentation, putrefaction, excluſion of the chick, the finer digeſtions, the making of tinctures and elixirs; and the adepts have uſed it for the firſt digeſtion of their mercury, by carrying the including veſſel conſtantly in their pocket.

The third degree of fire is that which extends from 94 degrees of the thermometer to 212, at which laſt water uſually boils. This degree is required in the diſtillation of ſimple and compound waters, the eſſential oils of vegetables, and will coagulate or conſolidate the ſerum, blood, and other animal juices, and conſequently deſtroy the creatures.

The fourth degree may be taken from 211 to 600 of the thermometer, within which latitude quickſilver or oil of vitriol boils, diſtils, or becomes volatile. This degree is ſuited to the melting of lead, tin, biſmuth, *&c.* and the ſubliming of ſal armoniac and ſulphur, the calcining of antimony, *&c.*

The fifth degree is that wherein the other metals melt, and which commences from 600 degrees of the thermometer, and ends where iron is held in a ſtate of fuſion. In this degree moſt bodies are deſtroyed; but glaſs, gold, ſilver, copper, and iron remain long unchanged; all other fixed bodies grow red hot in this degree, and all the unvitrifible ſtones are calcined.

The ſixth and higheſt degree of fire, hitherto known is that of the burning lens or concave, by M. Villette, Tſchirnhauſen, Buffon, and others. The focus of theſe lenſes will even volatilize what is called the metalline or mercurial part of gold, and vitrify the more terreſtrial. See the article BURNING GLASS.

The fires of ſand, filings of iron, and aſhes, have generally their degrees from the firſt to the third: the reverberatory fire has its degrees from the firſt to the fourth: the ignis rotæ ſerves for calcinations and fuſions; and a veſſel may receive different degrees of heat from a lighted lamp: the balneum mariæ and balneum vaporis have alſo their degrees, as has the fire of ſuppreſſion its degrees: Inſolation has its degrees in proportion to the heat of the ſun, to which the ſubſtances are expoſed: the bath of horſe's dung has its degrees, according to the bulk of the heap, or the place in which it is lodged: the bath of grape ſkins has alſo its degrees, like that of the bath of horſe's dung: and the heat of quick-lime has alſo its degrees; for according as we deſire it more or leſs ſtrong, we expoſe it in powder longer or ſhorter to the open air; and when we have occaſion for all its heat, we uſe it as quick as we poſſibly can.

Extinguiſhing of FIRES. The world has long been of an opinion, that a more ready way, than that in general uſe, might be found for extinguiſhing fires in buildings; and it has been generally attempted upon the doctrine of exploſion. Zachary Greyl was the firſt perſon who put this plan into execution with any tolerable degree of ſucceſs. He contrived certain engines, eaſily manageable, which he proved before ſome perſons of the firſt rank, to be of ſufficient efficacy, and offered to diſcover the ſecret by which they were contrived for a large premium, given either from the crown, or raiſed by a ſubſcription of private perſons. But this ſcheme meeting with no better ſucceſs than things of this nature uſually do, he died without making the diſcovery. Two years after this, the perſon, who had his papers, found the method, and it was ſhewn before the king of Poland and a great concourſe of nobility at Dreſden, and the ſecret purchaſed at a very conſiderable price. After this, the ſame perſon carried the invention to Paris and many other places, and practiſed it every where with ſucceſs. The ſecret was this: A wooden veſſel was provided holding a very conſiderable quantity of water: in the center of this was fixed a caſe made of iron-plates, and filled with gun-powder; from this veſſel, to the head of the larger veſſel containing the water, there was conveyed a tube or pipe, which might convey the fire very readily through the water to the gun-powder contained in the inner veſſel. This tube was filled with a preparation eaſily taking fire, and quickly burning away; and the manner of uſing the thing was, to convey it into the room or building where the fire was, with the powder in the tube lighted. The conſequence of this was, that the powder in the inner caſe ſoon took fire, and with a great exploſion burſt the veſſel to pieces, and diſperſed the water every way; thus was the fire put out in an inſtant, though the room was flaming before in all parts at once. The advantage of this invention was, that, at a ſmall expence, and with the help of a few people, a fire in its beginning might be extinguiſhed; but the thing was not ſo general as it was at firſt expected that it would prove, for though of certain efficacy in a chamber or cloſe building, where a fire had but newly begun, yet when the miſchief has increaſed ſo far that the houſe was fallen in, or the top open, the machine had no effect. This was the thing firſt diſcovered by Greyl, and from which our chemiſt Godfrey took the hint of the machine, which he called the water-bomb, and would fain have brought into uſe in England.

FIRE, in medicine. See CAUSTICS.

FIRE, in ſurgery. See CAUTERY.

St. Anthony's FIRE, in medicine. See the article ERYSIPELAS.

Walking FIRE, in meteorology. See the article WILL-WITH-A-WISP.

FIRE, in theology. See the articles HELL, CONFLAGRATION, *&c.*

We read of the ſacred fire in the firſt temple of Jeruſalem, concerning which the Jews have a tradition that it came down from heaven: it was kept with the utmoſt care, and it was forbidden to carry any ſtrange fire into the temple. This fire is one of the five things which the Jews confeſs were wanting in the ſecond temple.

The pagans had their ſacred fires, which they kept in their temples with the moſt religious care, and which were never to be extinguiſhed. Numa was the firſt who built a temple to fire, as a goddeſs, at Rome, and inſtituted an order of prieſteſſes for the preſervation of it. See the article VESTALS.

Fire was the ſupreme god of the Chaldæans; the magi were worſhippers of fire; and the Greeks and Armenians ſtill keep up a ceremony called the Holy Fire, upon a perſuaſion that every eaſter-day a miraculous fire deſcends from heaven into the holy ſepulchre, and kindles all the candles and lamps there. On this occaſion the church of the holy ſepulchre is crowded by a numerous and diſtracted mob, who make a ſolemn proceſſion with ſtandards, crucifixes, *&c.* after which the people light their candles at the ſacred flame, and immediately apply it to their beards, faces, and boſoms, pretending that it will not burn like an earthly flame; they alſo think that if they are buried in a ſhroud ſmutted with this celeſtial fire, it will ſecure them from the flames of hell.

FIRE, in the art of war, a word of command to the ſoldiers, to diſchrge their muſquets; to the cavalry, to diſcharge their carabines or piſtols; to the grenadiers, to fire their grenadoes; and to the gunners, to fire the guns.

Running FIRE is when a rank of men, drawn up, fire one after another: or, when the lines of an army are drawn out to fire on account of a victory, each ſquadron or battalion takes it from another, from the right of the firſt line to the left, and from the left to the right of the ſecond line.

FIRE-ARMS are all ſorts of arms charged with powder and ball, as cannon, muſquets, carabines, piſtoles, blunderbuſſes, *&c.* See CANNON, GUN, *&c.*

FIRE-BALL, in the art of war, a compoſition of meal-powder, ſulphur, ſalt-petre, pitch, *&c.* about the bigneſs of a hand-grenade, coated over with flax, and primed with a ſlow compoſition of a fuſee. This is to be thrown into the enemy's works in the night time, to diſcover where they are: or to fire houſes, galleries, or blinds of the beſiegers; but they are then armed with ſpikes or hooks of iron, that they may not roll off, but ſtick or hang where they are deſigned to have any effect.

FIRE LOCK: See GUN, MUSQUET, *&c.*

FIRE-MASTER, in our train of artillery, an officer, who gives the directions and proportions of ingredients for each compoſition required in fire-works, whether for the ſervice of war, or for rejoicings and recreations.

His orders are given to the fire-workers and bombardiers, who muſt execute them.

FIRE-POTS, in the military art, ſmall earthen pots, into which is put a charged grenade, and over that, powder enough till the grenade is covered; then the pot is covered with a piece of parchment, and two pieces of match acroſs lighted: this pot being thrown by a handle of match, where it is deſigned, it breaks and fires the powder, and burns all that is near it, and likewiſe fires the powder in the grenade, which ought to have no fuſe, to the end its operations may be the quicker.

FIRE-WORKERS, officers ſubordinate to the fire-maſter.

FIRE-WORKS. See PYROTECHNY.

FIRE-SHIP, in the navy, a veſſel charged with artificial fire-works, which, having the wind of an enemy's ſhip, grapples her, and ſets her on fire.

FIRE-BARE, in our old cuſtoms, ſignifies a beacon, or tower, by the ſea-ſide, wherein there were kept continual lights.

FIRE-BOTE is fuel or firing for neceſſary uſe, allowed to tenants, out of the lands granted to them.

FIRE-COCKS. Churchwardens in London and within the bills of mortality, are to fix fire-cocks at proper diſtances in ſtreets, and keep a large engine and hand-engine for extinguiſhing fire, under the penalty of 10l. ſtat. 6 Annæ, cap. xxxi.

On the breaking out of any fire in London and Weſtminſter, the conſtables and beadles of pariſhes ſhall repair to the place with their ſtaves, and aſſiſt in extinguiſhing it, and cauſe the people to work for that end, *&c.*

FIRE-OFFICE, an office of inſurance from fire. See the article ASSURANCE.

FIRE-ENGINE. See the article ENGINE.

Wild-FIRE, a kind of artificial or factitious fire, which burns even under water, and that with greater violence than out of it. It is compoſed of ſulphur, naphtha, pitch, gum, and bitumen; and is only extinguiſhable by vinegar mixed with ſand and urine, or by covering it with raw hides. Its motion or tendency is ſaid to be contrary to that of natural fire, and it always follows the direction in which it is thrown, whether it be downwards, ſideways, or otherwiſe.

Several are of opinion that the antient Greeks and Romans uſed this fire in their engagements at ſea: whether or not that was the caſe, it was applied againſt the Saracens in a ſea fight, commanded by Conſtantine Pogonates, in the Heleſpont, and with ſuch effect that he burnt the whole fleet therewith, wherein there were thirty thouſand men.

Electrical FIRE. See ELECTRICITY.

FIRING-IRON, in farriery, an inſtrument not unlike the blade of a knife; which being made red-hot, is applied to a horſe's hams, or other places ſtanding in need of it, as in preternatural ſwellings, farcy knots, *&c.* in order to diſcuſs them. Sometimes this is done for wrenches of the paſterns.

FIRKIN, an Engliſh meaſure of capacity, for things liquid, being the fourth part of the barrel: it contains 8 gallons of ale, ſoap, or herrings; and 9 gallons of beer. See MEASURE and BARREL.

FIRLOT, a dry meaſure uſed in Scotland. The oat-firlot contains 21¼ pints of that country; the wheat-firlot contains about 2211 cubical inches; and the barley-firlot, 31 ſtandard pints. Hence it appears that the ſcotch wheat-firlot exceeds the engliſh buſhel by 33 cubical inches. See the article MEASURE.

FIRMAMENT, in the ptolemaic aſtronomy, the eighth heaven or ſphere, with reſpect to the ſeven ſpheres of the planets which it ſurrounds. It is ſuppoſed to have two motions; a diurnal motion, given to it by the primum mobile, from eaſt to weſt about the poles of the ecliptic; and another oppoſite motion from weſt to eaſt, which laſt it finiſhes, according to Tycho, in 25412 years, according to Ptolemy in 36000, and according to Copernicus in 25800, in which time the fixed ſtars return to the ſame points in which they were at the beginning. This period is commonly called the Platonic year, or the great year.

FIRMAMENT is alſo uſed in divers places of ſcripture, to denote the middle region of the air. Several of the antients have believed, with the modern philoſophers, that the firmament is a fluid matter; but certainly thoſe who gave it the name of firmament, thought it a ſolid matter.

FIRMAN is a paſſport or permit granted by the great mogul to foreign veſſels, to trade within the territories of his juriſdiction.

FIRMNESS, *firmitas*, denotes the conſiſtence of a body, or that ſtate wherein its ſenſible parts cohere in ſuch a manner, that the motion of one part induces a motion of the reſt.

Many of the carteſians maintain, that firmneſs conſiſts in the mere reſt of the particles of a body, and their mutual immediate contact, alledging that a ſeparation of parts can only ariſe from ſome matter interpoſed between them, which matter is excluded by the notion of contiguity. But the inſufficiency of this hypotheſis is obvious; and the firmneſs of all bodies is known to depend on the connection or coheſion of their particles. See ATTRACTION, COHESION, &c.

FIRST-FRUITS, *primitiæ*, among the Hebrews, were oblations of part of the fruit of the harveſt, offered to God as an acknowledgment of his ſovereign dominion. The firſt of theſe fruits was offered in the name of the whole nation, being either two loaves of bread, or a ſheaf of barley which was threſhed in the court of the temple. Every private perſon was alſo obliged to bring his firſt-fruits to the temple, and theſe conſiſted of wheat, barley, grapes, figs, apricots, olives, and dates.

There was another ſort of firſt-fruits which were paid to God. When bread was kneaded in a family, a portion of it was ſet apart, and given to the prieſt or levite who dwelt in the place: if there was no prieſt or levite there, it was caſt into the oven, and conſumed by the fire. Theſe offerings made a conſiderable part of the revenues of the hebrew prieſthood. Firſt-fruits are frequently mentioned in antient chriſtian writers as one part of the church revenue. One of the councils of Carthage enjoins that they ſhould conſiſt only of grapes and corn, which ſhews that this was the practice of the african church.

FIRST-FRUITS, in the church of England, are the profits of every ſpiritual benefice for the firſt year, according to the valuation thereof in the king's books. See the article ANNATES.

FIRST MOVER, *primum mobile*. See the article PRIMUM MOBILE.

FISC, *fiſcus*, in the civil law, the treaſury of a prince. It differs from the ærarium, which was the treaſury of the public or people: thus, when the money ariſing from the ſale of condemned perſons goods, was appropriated for the uſe of the public, their goods were ſaid *publicari*; but when it was deſtined for the ſupport of the prince, they were called *confiſcari*.

FISCAL, in the civil law, ſomething relating to the pecuniary intereſt of the prince or people. The officers appointed for the management of the fiſc, were called *procuratores fiſci*, and *advocati fiſci*; and among the caſes enumerated in the conſtitutions of the empire, where it was their buſineſs to plead, one is againſt thoſe who have been condemned to pay a fine to the fiſc on account of their litigiouſneſs, or frivolous appeals.

FISH, in natural hiſtory, conſtitutes a claſs of animals which have no feet, but always fins; add to this, that their body is either altogether naked, or only covered with ſcales; and that they are aquatic animals, which live moſtly, if not always, in water.

This claſs is ſubdivided by authors into five ſeries, or orders.

1. The plagiuri or cetaceous fiſhes, comprehending thoſe who have the tail not perpendicular, like all other fiſhes, but placed in an horizontal direction, or parallel to the horizon. 2. Chondropterygious fiſhes, comprehending thoſe with perpendicular tails, and the rays of the fins not bony, but cartilaginous. 3. Branchioſtegious fiſhes, or thoſe which have perpendicular tails, the rays of the fins bony, and the branchiæ or gills not

oſſiculated. 4. Acanthopterygious fiſhes, or thoſe with perpendicular tails, and the rays of the fins bony, and prickly at the ends. 5. Malacopterygious fiſhes, or ſuch as have perpendicular tails, with the rays bony, but not prickly at their ends. See PLAGIURI, &c. and plate of ichthyology, where a fiſh of each ſeries is delineated, in the ſame order as above.

Some diſtinguiſh fiſhes, from the place where they are found, into ſea-fiſh, river-fiſh, and lake or pond-fiſh. Others again divide them into cetaceous, cartilaginous, and ſpinoſe. The cetaceous, or whale-kind, called *belluæ marinæ*, have lungs, and breathe like quadrupeds; they copulate alſo like them, and conceive and bring forth their young alive, whom they ſuckle with their milk. The cartilaginous kind are produced from large eggs, like birds, which are excluded the womb alſo like thoſe of birds. The ſpinoſe kind are alſo oviparous, but their eggs are ſmaller, and have ſpines up and down in their fleſh, to ſtrengthen it.

Willoughby thinks it would be better to diſtinguiſh fiſhes, firſt, into the cetaceous kind, or thoſe that breathe with lungs; and thoſe that breathe with gills: then to ſubdivide thoſe that breathe with gills, not into cartilaginous and ſpinoſe, but into oviparous and viviparous; with other the like ſubdiviſions. But the diviſion firſt laid down, is that followed by the beſt ichthyologiſts, Artedi, Linnæus, and others.

As to the ſtructure of fiſhes, it is admirably adapted to the element in which they live: their fins, tail, gills, air-bladder, eyes, figure, &c. are all ſuch as beſt ſuit their circumſtances; for the deſcription and uſes of which, ſee the articles FIN, TAIL, &c.

FISH, in commerce. The exporter, on making oath that they were britiſh taken, and really exported, is entitled to the following bounties, to be paid by the collector of the ſalt-duty, at the port of exportation, within thirty days after demand, upon a debenture prepared by the collector of the cuſtoms, *viz.*

		s.	d.
Pilchards, or ſcads, the caſk, containing 50 gallons,		7	0
Cod, Ling, or Hake	if 14 inches or upwards in length from the bone in the fin to the 3d joint in the tail, the 100	5	0
	wet, the barrel, containing 32 gallons,	2	0
	dried, the hundred wt.	3	0
Salmon, the barrel, containing 42 gallons		4	6
White herrings, the barrel, containing 32 gallons,		2	8
Full red herrings, the barrel as above		1	9
Clean ſhotten red herrings the barrel as above,		1	0
Dried red ſprats, the laſt		1	0

Fiſh of all ſorts, taken by foreigners and imported in foreign ſhips, are forfeited, together with the ſhip, except ſtock-fiſh, live eels, ſturgeon, botargo or cavear, and anchovies. And, by 1 Geo. I. cap. xviii. ſalmon taken in great rivers, and ſea-fiſh ſold, are to be of certain lengths, or the takers ſhall forfeit 5 l. and the ſellers 20 s. beſides the fiſh.

Generation of FISHES. See the article GENERATION.

Breeding of FISHES may be turned to great advantage; for beſides furniſhing your table, obliging your friends, and raiſing money, your land will be thereby greatly improved, ſo as yield more this way than by any other employment whatever.

When fiſh are fed in large pools or ponds, either malt boiled, or freſh grains, is the beſt food; thus carps may be raiſed and fed like capons, and tenches will feed as well. The care of feeding them is beſt committed to a gardener, or the butler, who ſhould be always at hand. In a ſtew, any ſort of grain boiled, eſpecially peas, and malt coarſe ground; alſo the grains after brewing, whilſt freſh and ſweet: but one buſhel of malt not brewed, will go as far as two of grains. See the article FISH-PONDS, *infra*.

FISH, in a ſhip, a plank or piece of timber, faſtened to a ſhip's maſt or yard, to ſtrengthen it, which is done by nailing it on with iron-ſpikes, and woulding or winding ropes hard about them.

FISHES, in heraldry, are the emblems of ſilence, and watchfulneſs, and are borne either upright, imbowed, extended, endorſed reſpecting each other, ſurmounting one another, fretted, &c.

In blazoning fiſhes, thoſe borne feeding, ſhould be termed devouring; all fiſhes borne upright and having fins, ſhould be blazoned hauriant; and thoſe borne tranſverſe the eſcutcheon, muſt be termed naiant.

FISH-BLOCK, in a ſhip. See BLOCK.

FISH-GARTH, a wear or dam in a river, for catching of fiſh. See WEAR.

FISH-SHELLS, in huſbandry. See SHELL.

Fish-ponds, thoſe made for the breeding or feeding of fiſh.

Fiſh-ponds are no ſmall improvement of watery and boggy lands, many of which are fit for no other uſe. In making of a pond, its head ſhould be at the loweſt part of the ground, that the trench of the flood-gate or ſluice, having a good fall, may not be too long in emptying. The beſt way of making the head ſecure, is to drive in two or three rows of ſtakes above ſix feet long,. at about four feet diſtance from each other, the whole length of the pond-head, whereof the firſt row ſhould be rammed at leaſt about four feet deep. If the bottom is falſe, the foundation may be laid with quick-lime, which ſlacking, will make it as hard as a ſtone. Some lay a layer of lime, and another of earth dug out of the pond, among the piles and ſtakes; and when theſe are well covered, drive in others, as they ſee occaſion, ramming in the earth as before, till the pond-head be of the height deſigned.

The dam ſhould be made ſloping on each ſide, leaving a waſte to carry off the overabundance of water in times of floods or rains; and as to the depth of the pond, the deepeſt part need not exceed ſix feet, riſing gradually in ſhoals towards the ſides, for the fiſh to ſun themſelves, and lay their ſpawn. Gravelly and ſandy bottoms, eſpecially the latter, are beſt for breeding; and a fat ſoil with a white fat water, as the waſhings of hills, commons, ſtreets, ſinks, *&c.* is beſt for fattening all ſorts of fiſh. For ſtoring a pond, carp is to be preferred for its goodneſs, quick growth, and great increaſe, as breeding five or ſix times a year. A pond of an acre, if it be a feeding and not breeding one, will every year feed two hundred carps of three years old, three hundred of two years old, and four hundred of a year old. Carps delight in ponds that have marl or clay-bottoms, with plenty of weeds and graſs, whereon they feed in hot months.

Your pond ſhould be drained every three or four years, and your fiſh ſorted. If it is a breeding one, the ſmaller ones are to be taken out, to ſtore other ponds with; leaving a good ſtock of females, at leaſt eight or nine years old, as they never breed before that age. In feeding ponds, it is beſt to keep them pretty near of a ſize.

FISHERY, a place where great numbers of fiſh are caught.

The principal fiſheries for ſalmon, herring, mackrel, pilchards, *&c.* are along the coaſts of England, Scotland, and Ireland; for cod on the banks of Newfoundland; for whales, about Greenland; and for pearls, in the Eaſt and Weſt Indies.

Fishery denotes alſo the commerce of fiſh, more particularly the catching them for ſale.

Were we to enter into a very minute and particular conſideration of fiſheries, as at preſent eſtabliſhed in this kingdom, this article would ſwell beyond its proper bounds; becauſe to do juſtice to a ſubject of that concernment to the britiſh nation, requires a very ample and diſtinct diſcuſſion. We ſhall, however, obſerve, that ſince the divine providence has ſo eminently ſtored the coaſts of Great Britain and Ireland with the moſt valuable fiſh; and ſince fiſheries, if ſucceſsful, become permanent nurſeries for breeding expert ſeamen; it is not only a duty we owe to the ſupreme being, not to deſpiſe the wonderful plenty he hath afforded us, by neglecting to extend this branch of commerce to the utmoſt; but it is a duty we owe to our country, for its natural ſecurity, which depends upon the ſtrength of our royal navy. No nation can have a navy, where there is not a fund of buſineſs to breed and employ ſeamen, without any expence to the public, and no trade is ſo well calculated for training up theſe uſeful members of this ſociety, as fiſheries.

The ſituation of the britiſh coaſts is the moſt advantageous for catching fiſh in the world; the ſcottiſh iſlands, particularly thoſe to the north and weſt, lie moſt commodious for carrying on the fiſhing trade to perfection; for no country in Europe can pretend to come up to Scotland in the abundance of the fineſt fiſh, with which its various creeks, bays, rivers, lakes, and coaſts are repleniſhed. King Charles I. was ſo ſenſible of the great advantage to be derived from fiſheries, that he began the experiment, together with a company of merchants; but the civil war ſoon occaſioned that project to be ſet aſide. King Charles II. made a like attempt, but his preſſing wants made him withdraw what money he had employed that way, whereupon the merchants that joined with him, did ſo too. Since the union, ſeveral attempts have been made to retrieve the fiſheries, and a corporation ſettled to that effect, intitled the Royal Britiſh fiſhery.

In the year 1750, the parliament of Great

Britain taking the ſtate of the fiſheries into conſideration, an act was paſſed for the encouragement of the white-herring fiſhery, granting a charter, whereby a corporation is created, to continue twenty-one years, by the name of the Society of the Free Britiſh Fiſhery, to be under the direction of a governor, preſident, vice-preſident, council, &c. who are to continue in office the ſpace of three years, with power to make bye-laws, &c. and to raiſe a capital of 500,000 l. by way of ſubſcription. And any number of perſons, who, in any part of Great Britain, ſhall ſubſcribe 10,000 l. into the ſtock of this ſociety, under the name of the Fiſhing Chamber, and carry on the ſaid fiſhery on their own account of profit and loſs, ſhall be intitled to the ſame bounty allowed to the ſociety. The bounty is 30 s. the tun, to be paid yearly, for fourteen years, beſides 3 *per cent.* for the money advanced by each chamber. The act contains other proper regulations relative to the nets, marks on the herring-barrels, number of hands, and the quantity of ſalt that is intitled to the bounty, &c. It is then by the encouragement given by this act, that we now ſee a laudable emulation prevailing all over the two kingdoms, and fiſhing buſſes fitted out from almoſt every port, in order to repair to the Shetland iſlands, where the herring-fiſhery is carried on with an ardor becoming ſo important a branch of trade. Scotland, which ſuffered incredibly from the neglect of this valuable and natural produce of the ſeas, has not been backward to join in a ſcheme that tends ſo evidently to its own advantage; for the cities of Edinburgh and Glaſgow, the towns of Montroſe, Dundee, Perth, Inverneſs, and ſome other boroughs, have raiſed the proper ſum, and chambers have been erected in each of them; the gentlemen of eſtates adjoining to the reſpective places above-mentioned, liberally contributing with merchants, towards the proſecution of an undertaking ſo viſibly tending to the good of their country in general.

Anchovy-FISHERY. Anchovies are fiſhed on the coaſt of Provence, in the months of May, June, and July, at which ſeaſon ſhoals of this fiſh regularly come into the Mediterranean through the ſtreights of Gibraltar. They are likewiſe found in plenty in the river of Genoa, on the coaſt of Sicily, and on that of the iſland of Gorgone oppoſite to Leghorn; theſe laſt are reckoned the beſt. It is remarkable, that anchovies are ſeldom fiſhed but in the night-time. If a fire be kindled on the poops of the veſſels uſed for this fiſhing, the anchovies will come in greater numbers into the nets; but then it is aſſerted, that the anchovies taken thus by fire, are neither ſo good nor ſo firm, and will not keep ſo well, as thoſe which are taken without fire. When the fiſhery is over, they pull off the heads of all the anchovies, gut them, and afterwards range them in barrels of different weights, the largeſt of which do not weigh above 25 or 26 pounds, and they put a good deal of ſalt in them. Some alſo pickle them in ſmall earthen pots made on purpoſe, of two or three pounds weight more or leſs, which they cover with plaſter, to keep them the better.

Cod FISHERY. There are two kinds of cod-fiſh, the one green or white cod, and the other dried or cured cod, tho' it is all the ſame fiſh differently prepared; the former being ſometimes ſalted and barrelled, then taken out for uſe; and the latter having lain ſome competent time in ſalt, dried in the ſun or ſmoke. We ſhall therefore ſpeak of each of theſe apart, and firſt of

Green cod-FISHERY. The chief fiſheries for green cod are in the Bay of Canada, on the great bank of Newfoundland, and on the iſle of St. Peter, and the iſle of Sable, to which places veſſels reſort from divers parts both of Europe and America. They are from 100 to 150 tuns burden, and will catch between 30 and 40 thouſand cod each. The moſt eſſential part of the fiſhery, is to have a maſter who knows how to cut up the cod, one who is ſkilled to take the head off properly, and above all, a good ſalter, on which the preſerving them, and conſequently the ſucceſs of the voyage, depends. The beſt ſeaſon is from the beginning of February to the end of April; the fiſh which in the winter retire to the deepeſt water, coming then on the banks, and fattening extremely. What is caught from March to June keeps well, but thoſe taken in July, Auguſt, and September, when it is warm on the banks, are apt to ſpoil ſoon. Every fiſher takes but one at a time: the moſt expert will take from 350 to 400 in a day, but that is the moſt, the weight of the fiſh and the great coldneſs on the bank fatiguing very much. As ſoon as the cod are taken, the head is taken off; they are opened, gutted and ſalted, and the ſalter ſtows them in the bottom of the hold, head to tail, in beds a fathom or two ſquare; laying layers of ſalt and fiſh alternately, but never mixing fiſh caught on different days. When they have lain thus three or four days to drain off the water, they are replaced in another part of the ſhip, and ſalted again; where they remain till the veſſel is loaded. Sometimes they are cut in thick pieces, and put up in barrels for the conveniency of carriage.

Dry cod FISHERY. The principal fiſhery for dry cod, is from Cape Roſe to the Bay des Exports, along the coaſt of Placentia, in which compaſs there are divers commodious ports for the fiſh to be dried in. Theſe, though of the ſame kind with the freſh cod, are much ſmaller, and therefore fitter to keep, as the ſalt penetrates more eaſily into them. The fiſhery of both is much alike, only this latter is more expenſive, as it takes up more time, and employs more hands, and yet ſcarce half ſo much ſalt is ſpent in this as in the other. The bait is herrings, of which great quantities are taken on the coaſt of Placentia. When ſeveral veſſels meet and intend to fiſh in the ſame port, he whoſe ſhalloop firſt touches ground, becomes intitled to the quality and privileges of admiral: he has the choice of his ſtation, and the refuſal of all the wood on the coaſt at his arrival. As faſt as the maſters arrive, they unrig all their veſſels, leaving nothing but the ſhrouds to ſuſtain the maſts, and in the mean time the mates provide a tent on ſhore, covered with branches of trees, and ſails over them, with a ſcaffold of great trunks of pines, twelve, fifteen, ſixteen, and often twenty feet high, commonly from forty to ſixty feet long, and about one third as much in breadth. While the ſcaffold is preparing, the crew are fiſhing, and as faſt as they catch they bring their fiſh aſhore; open and ſalt them upon moveable benches; but the main ſalting is performed on the ſcaffold. When the fiſh have taken ſalt, they waſh and hang them to drain on rails; when drained, they are laid on kinds of ſtages, which are ſmall pieces of wood laid acroſs, and covered, with branches of trees, having the leaves ſtripped off, for the paſſage of the air. On theſe ſtages, they are diſpoſed, a fiſh thick, head againſt tail, with the back uppermoſt, and are turned carefully, four times every twenty-four hours. When they begin to dry, they are laid in heaps ten or twelve thick, in order to retain their warmth; and every day the heaps are enlarged, till they become double their firſt bulk; then two heaps are joined together, which they turn every day as before; laſtly, they are ſalted again, beginning with thoſe firſt ſalted, and being laid in huge piles, they remain in that ſituation, till they are carried on board the ſhips, where they are laid on the branches of trees diſpoſed for that purpoſe, upon the ballaſt, and round the ſhip, with mats to prevent their contracting any moiſture.

There are four kinds of commodities drawn from cod, *viz.* the zounds, the tongues, the roes, and the oil extracted from the liver. The firſt is ſalted at the fiſhery, together with the fiſh, and put up in barrels from 6 to 700 pound. The tongues are done in like manner, and brought in barrels from 4 to 500 pounds. The roes are alſo ſalted in barrels, and ſerve to caſt into the ſea to draw fiſh together, and particularly pilchards. The oil comes in barrels, from 400 to 520 pounds, and is uſed in dreſſing leather. The Scots catch a ſmall kind of cod on the coaſt of Buchan, and all along the Murray Firth on both ſides; as alſo in the Firth of Forth, Clyde, &c. which is much eſteemed. They ſalt and dry them in the ſun upon rocks, and ſometimes in the chimney. They alſo cure ſkait, and other ſmaller fiſh in the ſame manner, but moſt of theſe are for home-conſumption.

Coral FISHERY. See CORAL-*Fiſhery*.

Herring-FISHERY. Herrings are chiefly found in the north-ſea. They are a fiſh of paſſage, and commonly go in ſhoals, being very fond of following fire or light, and in their paſſage they reſemble a kind of lightning. About the beginning of June, an incredible ſhoal of herrings, probably much larger than the land of Great-Britain and Ireland, come from the north on the ſurface of the ſea: their approach is known by the hovering of ſea fowl in expectation of prey, and by the ſmoothneſs of the water; but where they breed, or what particular place they come from, cannot be eaſily diſcovered. As this great ſhoal paſſes between the ſhores of Greenland and the north cape, it is probably confined, and as it reaches the extremities of Great Britain, is neceſſarily divided into two parts. For we find one part of the herrings, fleeting weſt, or ſouth-weſt, and leaving the iſlands of Shetland and Orkney to the left, paſs on towards Ireland, where being interrupted a ſecond time, ſome keeping the ſhore of Britain, paſs away ſouth down St. George's channel; while the other part edging off to the ſouth-weſt, coaſt the weſtern ocean, till they reach the ſouth ſhore of Ireland, and then ſteering ſouth-eaſt, join the reſt in St. George's channel. The other part of the firſt diviſion made in the north, parting a little to the eaſt and ſouth-eaſt, paſs by Shetland, and then make the point of Buchan-neſs, and the coaſt of Aberdeen, filling as they go, all the bays, firths, creeks, *&c.* with their innumerable multitudes. Hence they proceed forward, paſs by Dunbar, and rounding the high ſhores of St. Abbe's Head, and Berwick, are ſeen again off Scarborough; and even then not diminiſhed in bulk, till they come to Yarmouth-Roads, and from thence to the mouth of of the Thames, after which, paſſing down the Britiſh channel, they ſeem to be loſt in the weſtern ocean.

The vaſt advantage of this fiſhery to our nation is very obvious, when we conſider that though herrings are found upon the ſhores of North America, they are never ſeen there in ſuch quantities as with us, and that they are not to be met with in conſiderable numbers in any of the ſouthern kingdoms of Europe as Spain, Portugal, or the ſouth parts of France on the ſide of the ocean, or in the Mediterranean, or on the coaſt of Africa. There are two ſeaſons for fiſhing herring, the firſt from June to the end of Auguſt, and the ſecond in autumn, when the fogs become very favourable for this kind of fiſhing. The Dutch begin their herring-fiſhing on the 24th of June, and employ no leſs than two thouſand veſſels therein called buſſes, being between forty-five and ſixty tuns burden, and carrying three or four ſmall cannon. They never ſtir out of port without a convoy, unleſs there be enough together to make about eighteen or twenty cannon among them, in which caſe they are allowed to go in company. Before they go out, they make a verbal agreement, which has the ſame force as if it were in writing. The regulations of the admiralty of Holland are partly followed by the French, and other nations, and partly improved and augmented with new ones, as, that no fiſher ſhall caſt his net within a hundred fathoms of another boat: that while the nets are caſt, a light ſhall be kept on the hind part of the veſſel: that when a boat is by any accident obliged to leave off fiſhing, the light ſhall be caſt into the ſea: that when the greater part of a fleet leaves off fiſhing, and caſts anchor, the reſt ſhall do the ſame, *&c.* By the late act of parliament in Great-Britain, the regulations are, that every veſſel intitled to the bounty, muſt carry twelve Wincheſter buſhels of ſalt in new barrels, for every laſt of fiſh ſuch veſſel is capable of holding; and as many more new barrels as ſuch veſſels can carry; and two fleets of tanned nets, that is, a veſſel of ſeventy tons ſhall carry one fleet of fifty nets, each net to be thirty yards full upon its rope, and ſeven fathoms deep; and ſo in proportion for greater or ſmaller veſſels; and be provided with one other fleet of fifty like nets, on board a tender, or left on ſhore in a proper place for the uſe of the ſaid veſſel, *&c.*

There is nothing particular in the manner of fiſhing. The nets wherein the fiſh are drawn, ſhould regularly have their meſhes an inch ſquare to let all the leſſer fry go through.

Curing and preparing Herring. The commerce of herring both white or pickled, and red, is very conſiderable. The white Dutch herrings are the moſt eſteemed, being diſtinguiſhed into four ſorts, according to their ſizes; and the beſt are thoſe that are fat, fleſhy, firm, and white, ſalted the ſame day they are taken, with good ſalt and well barrelled. The britiſh herrings are little inferior, if not equal to the Dutch, for in ſpite of all their endeavours to conceal the ſecret, their method of curing, laſting, or caſking the herrings, has been diſcovered, and is as follows. After they have hawled in their nets, which they drag in the ſterns of their veſſels backwards and forwards in traverſing the coaſt, they throw them upon the ſhip's deck, which is cleared of every thing for that purpoſe; the crew is ſeparated into ſundry diviſions, and each diviſion has a peculiar taſk: one part opens and guts the herrings, leaving the melts and roes: another cures and ſalts them, by lining or rubbing their inſide with ſalt: the next packs them, and between each row and diviſion they ſprinkle handfuls of ſalt: laſtly, the cooper puts the finiſhing hand to all by heading the caſks very tight, and ſtowing them in the hold. It is cuſtomary with us to waſh the herring in freſh water, and ſteep them twelve or fifteen hours, in a ſtrong brine, before we proceed to barrel them.

Red Herrings muſt lie twenty-four hours in the brine, in as much as they are to take all their ſalt there, and when they are taken out, they are ſpitted, that is, ſtrung by the head on little wooden ſpits, and then hung in a chimney made for that purpoſe. After which, a fire of bruſh-wood which yields a deal of ſmoke, but no flame, being made under them, they remain there till ſufficiently ſmoked and dried, and are afterwards barrelled up for keeping.

Mackrel-FISHERY. The mackrel are found in large ſhoals in the ocean, but eſpecially on the french and engliſh coaſts. They enter the engliſh channel in April, and proceeding as the ſummer advances; about June, they are on the coaſts of Cornwal, Suſſex, Normandy, Picardy, *&c.* where the fiſhery is moſt conſiderable. They are taken either with a line or nets: the latter is preferable, and is uſually performed in the night-time. They are pickled two ways, firſt by opening and gutting them, and cramming their bellies as hard as poſſible with ſalt, by means of a ſtick, and then laying them in rows at the bottom of the veſſel, ſtrewing ſalt between each layer. The ſecond way is putting them directly into tubs full of brine, made of ſalt and freſh water, and leaving them to ſteep till they have taken ſalt enough to keep. After this, they are barrelled up and preſſed cloſe down.

Pearl-FISHERY. See PEARL FISHERY.

Pilchard-FISHERY. The chief pilchard fiſheries are along the coaſts of Dalmatia, on the coaſt of Bretagne, and along the coaſts of Cornwal and Devonſhire. That of Dalmatia is very plentiful: that on the coaſts of Bretagne employs annually about 300 ſhips. The pilchards caught on our coaſts, though bigger, are not ſo much valued as thoſe on the coaſts of France, owing principally to their not being ſo thoroughly cured. They naturally follow the light, which contributes much to the facility of the fiſhery: the ſeaſon is from June to September. On the coaſts of France they make uſe of the roes of the cod-fiſh, as a bait, which thrown into the ſea, makes them riſe from the bottom, and run into the nets: On our coaſts there are perſons poſted aſhore, who ſpying by the colour of the water where the ſhoals are, make ſigns to the boats to go among them to caſt their nets. When taken, they are brought on ſhore to a warehouſe, where they are laid up in broad piles, ſupported with backs and ſides, and as they are piled, they ſalt them with bay ſalt, in which lying to ſoak twenty or thirty days, they run out a deal of blood, with dirty pickle and bittern: then they waſh them clean in ſea-water, and when dry, barrel and preſs them hard down to ſqueeze out the oil, which iſſues out at a hole in the bottom of the caſk. The corniſh men obſerve of the pilchard, that it is the leaſt fiſh in ſize, moſt in number, and greateſt for gain, of any they take out of the ſea.

Salmon-FISHERY. The chief ſalmon fiſheries in Europe are in England, Scotland, and Ireland, in the rivers, and ſea-coaſts adjoining to the river mouths. Thoſe moſt diſtinguiſhed for ſalmon in Scotland, are the River Tweed, the Clyde, the Tay, the Dee, the Don, the Spey, the Neſs, the Bewley, *&c.* in moſt of which it is very common about the height of ſummer, eſpecially if the weather happen to be very hot, to catch four or five ſcore of ſalmon at a draught. The chief rivers in England for ſalmon are the Tyne, the Trent, the Severn, and the Thames. The fiſhing uſually begins about January, and in Scotland, they are obliged to give over about the 15th of Auguſt, becauſe, as it is then ſuppoſed the fiſh come up to ſpawn, it would be quite depopulating the rivers to continue fiſhing any longer. It is performed with nets, and ſometimes with a kind of locks or wears made on purpoſe, which in certain places have iron or wooden grates ſo diſpoſed, in an angle, that being impelled by any force in a contrary direction to the courſe of the river, they may give way and open a little at the point of contact, and immediately ſhut again, cloſing the angle. The ſalmon, therefore, coming up into the rivers, are admitted into theſe grates, which open, and ſuffer them to paſs through, but ſhut again, and prevent their return. Salmon are alſo caught with a ſpear, which they dart into him when they ſee him ſwimming near the ſurface of the water. It is cuſtomary likewiſe to catch them with a candle and lanthorn, or wiſp of ſtraw ſet on fire; for the fiſh naturally following the light, are ſtruck with the ſpear, or taken in a net ſpread for that purpoſe, and lifted with a ſudden jerk from the bottom. We make no mention of the method of catching ſalmon with a line or hook, becauſe it is much the ſame with that explained under the article *Trout* FISHING.

Curing Salmon. When the ſalmon are taken, they open them along the back, take out the guts and gills, and cut out the greateſt part of the bones, endeavouring to make the inſide as ſmooth as poſſible, then ſalt the fiſh in large tubs for the purpoſe, where they lie a conſiderable time ſoaking in brine, and about October, they are packed cloſe up in barrels, and ſent to London, or exported up the Mediterranean. They have alſo in Scotland, a great deal of ſalmon ſalted in the common way, which after ſoaking in brine a competent time, is well preſſed, and then dried in ſmoke: this is called kipper, and is chiefly made for home-conſumption, and if properly cured and prepared, is reckoned very delicious.

Sturgeon-FISHERY. The greateſt ſturgeon-fiſhery is in the mouth of the Volga, on the Caſpian Sea, where the Muſcovites employ a great number of hands, and catch them in a kind of incloſure formed by huge ſtakes, repreſenting the letter Z, repeated ſeveral times. Theſe fiſheries are open on the ſide next the ſea, and cloſe on the other, by which means the fiſh aſcending in its ſeaſon up the river, is embarraſſed in theſe narrow angular retreats, and ſo is eaſily killed with a harping-iron. Sturgeons, when freſh, eat deliciouſly, and in order to make them keep, they are ſalted or pickled in large pieces, and put up in cags from thirty to fifty pounds. But the great object of this fiſhery is the roe, of which the Muſcovites are extremely fond, and of which is made the cavear or kavia, ſo much eſteemed by the Italians. See the article CAVEAR.

Whale FISHERY. Whales are chiefly caught in the north ſea: the largeſt ſort are found about Greenland, or Spitzbergen. At the firſt diſcovery of this country, whales not being uſed to be diſturbed, frequently came into the very bays, and were accordingly killed almoſt cloſe to the ſhore, ſo that the blubber being cut off was immediately boiled into oil on the ſpot. The ſhips in thoſe times, took in nothing but the pure oil and the fins, and all the buſineſs was executed in the country, by which means a ſhip could bring home the product of many more whales than ſhe can according to the preſent method of conducting this trade. The fiſhery alſo was then ſo plentiful, that they were obliged ſometimes to ſend other ſhips to fetch off the oil they had made, the quantity being more than the fiſhing ſhips could bring away. But time and change of circumſtances have ſhifted the ſituation of this trade. The ſhips coming in ſuch numbers from Holland, Denmark, Hamburgh, and other northern countries, all intruders upon the Engliſh, who were the firſt diſcoverers of Greenland, the whales diſturbed, and gradually, as other fiſh often do, forſaking the place, were not to be killed ſo near the ſhore as before, but are now found, and have been ſo ever ſince, in the openings and ſpaces among the ice, where they have deep water, and where they go ſometimes a great many leagues from the ſhore.

The whale-fiſhery begins in May, and continues all June and July; but whether the ſhips have good or bad ſucceſs, they muſt come away and get clear of the ice by the end of Auguſt; ſo that in the month of September at fartheſt, they may be expected home; but a ſhip that meets with a fortunate and early fiſhery in May, may return in June or July.

The manner of taking whales at preſent is as follows. As ſoon as the fiſhermen hear the whale blow, they cry out *fall! fall!* and every ſhip gets out its long boat, in each of which there are ſix or ſeven men: they row till they come pretty near the whale, then the harpooner ſtrikes it with the harpoon. This requires great dexterity, for through the bone of his head there is no ſtriking, but near his ſpout there is a ſoft piece of fleſh, into which the iron ſinks with eaſe. As ſoon as he is ſtruck, they take care to give him rope enough, otherwiſe, when he goes down, as he frequently does, he would inevitably ſink the boat: this rope he draws with ſuch violence, that, if it were not well watered, it would by its friction againſt the ſides of the boat, be ſoon ſet on fire. The line faſtened to the harpoon is ſix or ſeven fathoms long, and is called the fore-runner: it is made of the fineſt and ſofteſt hemp, that it may ſlip the eaſier: to this they join a heap of lines of 90 or 100 fathoms each, and when there are not enough in one long boat, they borrow from another. The man at the helm obſerves which way the rope goes, and ſteers the boat accordingly, that it may run exactly out before;

for the whale runs away with the line with ſo much rapidity, that he would overſet the boat, if it were not kept ſtraight. When the whale is ſtuck, the other long boats row before, and obſerve which way the line ſtands, and ſometimes pull it; if they feel it ſtiff, it is a ſign the whale ſtill pulls in ſtrength; but if it hangs looſe, and the boat lies equally high before and behind upon the water, they pull it in gently, but take care to coil it ſo, that the whale may have it again eaſily if he recovers ſtrength: they take care, however, not to give him too much line, becauſe he ſometimes entangles it about a rock, and pulls out the harpoon. The fat whales do not ſink as ſoon as dead, but the lean ones do, and come up ſome days afterwards. As long as they ſee whales, they loſe no time in cutting up what they have taken, but keep fiſhing for others: when they ſee no more, or have taken enough, they begin with taking off the fat and whiſkers in the following manner. The whale being laſhed along ſide, they lay it on one ſide, and put two ropes, one at the head, and the other in the place of the tail, which together with the fins is ſtruck off, as ſoon as he is taken, to keep thoſe extremities above water. On the off ſide of the whale are two boats to receive the pieces of fat, utenſils and men that might otherwiſe fall into the water on that ſide. Theſe precautions being taken, three or four men with irons at their feet, to prevent ſlipping, get on the whale, and begin to cut out pieces of about three feet thick, and eight long, which are hauled up at the capſtane or windlaſs. When the fat is all got off, they cut off the whiſkers of the upper jaw with an ax. Before they cut, they are all laſhed to keep them firm, which alſo facilitates the cutting, and prevents them from falling into the ſea; when on board, five or ſix of them are bundled together, and properly ſtowed, and after all is got off, the carcaſs is turned adrift, and devoured by the bears, who are very fond of it. In proportion as the large pieces of fat are cut off, the reſt of the crew are employed in ſlicing them ſmaller, and picking out all the lean. When this is prepared, they ſtow it under the deck, where it lies till the fat of all the whales is on board; then cutting it ſtill ſmaller, they put it up in tubs in the hold, cramming them very full and cloſe, Nothing now remains but to ſail homewards, where the fat is to be boiled and melted down into train oil.

It were in vain to ſpeak in this place of the advantages that may be derived to Great Britain from the whale-fiſhery. We ſhall only remark, that the legiſlature thinks that trade of ſo great importance, as to grant a very conſiderable bounty for the encouragement of it; for every britiſh veſſel of 200 tons or upwards, bound to the Greenland-ſeas on the whale-fiſhery, if found to be duly qualified according to the act, obtains a licence from the commiſſioners of the cuſtoms to proceed on ſuch voyage: and on the ſhip's return, the maſter and mate making oath that they proceeded on ſuch voyage and no other, and uſed all their endeavours to take whales, &c. and that all the whale-fins, blubber, oil, &c. imported to their ſhip, were taken by their crew in thoſe ſeas, there ſhall be allowed 40 s. for every ton according to the admeaſurement of the ſhip.

Beſides theſe fiſheries, there are ſeveral others both on the coaſts of Great Britain and, in the north ſeas, which although not much the ſubject of merchandize, nevertheleſs employ great numbers both of ſhips and men; as 1. The oyſter fiſhing at Colcheſter, Feverſham, the Iſle of Wight, in the Swales of the Medway, and in all the creeks between Southampton, and Chicheſter, from whence they are carried to be fed in pits about Wevenhoe, and other places. See the article OYSTER.

2. The lobſter fiſhing all along the britiſh channel, the firth of Edinburgh, on the coaſt of Northumberland, and on the coaſt of Norway, from whence great quantities are brought to London. And laſtly, the fiſhing of the pot-fiſh, fin-fiſh, ſea-unicorn, ſea-horſe, and the ſeal, or dog-fiſh, all which are found in the ſame ſeas with the whales, and yield blubber in a certain degree; beſides, the horn of the unicorn is as eſtimable as ivory, and the ſkins of the ſeals are particularly uſeful to trunk makers.

FISHING, in general, the art of catching fiſh, whether by means of nets, or of ſpears, lines, rods, and hooks. See the article NET, LINE, ROD, &c.

By ſeveral ſtatutes it is provided, that no perſons ſhall fiſh in any pond or moat, without the owner's conſent, on pain of three months impriſonment; nor ſhall any one take fiſh in a river without licence obtained from the owner, upon forfeiture of 10 s. to the poor, and triple damages to the party aggrieved, to be levied by juſtices of the peace, by diſtreſs and ſale of goods. The nets, and other implements, belonging to poachers, may be ſeized by the owners of rivers, *&c.*

Fiſhing performed with a rod, line, and hook, is called angling. See ANGLING.

Carp-FISHING requires a world of patience, by reaſon they ſeldom bite in cold weather, and, in hot, the angler cannot be too early, or too late; but when they do bite, there is no fear of the hold. The baits proper for them, are the red worms in March, the cadew in June, and the graſs-hopper in July, Auguſt, and September. See CARP and BAIT.

Chub-FISHING is performed with a large bait, whether worm, ſnail, fly, cheeſe, *&c.* according to the ſeaſon and time of the day; but the large yellow moth ſeems to be a favourite morſel of this fiſh. See the article CHUB.

Cod FISHING. See FISHERY, *ſupra.*

Dace-FISHING affords good ſport, as they catch at any fly, particularly the ſtone-cadew, and may-fly, in the beginning of ſummer, and the ant-fly in June, July, Auguſt, *&c.* But to catch dace in winter, the bait is a white worm, with a large red head, found in ploughed lands. See the article DACE.

Eel-FISHING. The ſilver-eel may be catched with ſeveral ſorts of baits, as powdered beef, garden-worms, lobs, minnows, garbage, *&c.* The night is the beſt time for this kind of fiſhing; throwing a line with good ſtore of hooks, baited and well plumbed, into the places where eels reſort, with a float to diſcover where the lines lie, that they may be taken up in the morning.

As to the method called bobbing and ſniggling, it is only by means of a ſtick thruſting a baited hook into the holes where eels uſe to hide themſelves. Some fiſh for eels with a three-forked ſpear jagged on the ſides: this they ſtrike into the mud, and if it chance to light where they lie, there is no fear of ſecuring them. But to take the largeſt eels of all, the night hooks are to be baited with ſmall roaches, and the hooks muſt lie in the mouth of the fiſh. See the article EEL.

Flounder-FISHING, in the months of April, May, June, and July, may be performed all day long, either in the ſtream, or ſtill deep-water, but the ſtream is beſt; and the moſt proper baits are all ſorts of red-worms, waſps, or gentles. See the article FLOUNDER.

Gudgeon FISHING may be performed with float, the hook being on the ground; or by hand, with a running line on the ground, without cork or float. A ſmall red worm is the beſt bait for this fiſh, yet waſps, gentles, and cad-bits, will do very well; and, in order to gather them to the place, it may not be improper to ſtir the ſand and gravel, above and below it, by which means they will bite faſter, and with more eagerneſs. See the article GUDGEON.

Herring FISHING. See the articles FISHERY, *ſupra,* and HERRING.

Mackrel-FISHING. See the article FISHERY, *ſupra,* and MACKREL.

Pearch-FISHING. The proper baits are a minnow, or little frog; but the beſt of all is a worm called a brandling. You may alſo angle for this fiſh with job worms, bobs, waſps, *&c.* If you row for a pearch with a minnow, which of all baits yields the beſt ſport to the angler, it muſt be alive, ſticking the hook through the upper lip, or back-fin, letting it ſwim about midwater, or ſomewhat lower; for which end you ought to have an indifferent large hook, with a quill on your line; but ſome, with good ſucceſs, have uſed a ſtrong ſilk-line, and a hook armed with wire. If you fiſh with a frog, the hook muſt be faſtened through the ſkin of the leg, toward the upper part thereof.

Pike-FISHING is performed two ways, 1. By the ledger-bait, fixed in one certain place; which muſt be a living bait of fiſh or frog, as dace, roach, pearch, and yellow frogs. 2. By the walking bait, with a troll and winch, ſo as to give the fiſh length enough to run off with the bait, then ſtriking him with a ſmart jerk. The rod muſt not be too ſlender at top; and the line ſhould be of ſilk two yards and a quarter next the hook, and ſtrongly armed with a wire about ſeven inches.

Pilchard-FISHING. See FISHERY, *ſupra,* and PILCHARD.

Roach-FISHING is beſt performed, in April, with cads or worms; and, in ſummer, with white ſmall ſnails, or flies; but then the baits ſhould be under water; for they will not bite at top. Some uſe a may-fly with good ſucceſs; and, in autumn, a paſte, made of the crumb of fine bread, will do very well. The manner of fiſhing for roach at London is peculiar. They take a ſtrong cord, at the end of which is faſtened a three pound weight; and a foot above the lead, a pack-thread of twelve feet is made faſt to the cord; and to the pack-thread, at proper diſtances, they add twelve ſtrong links of hair, with roach hooks at them, baited with a white ſnail or periwinkle. Then holding the cord in their hands, the biting of the fiſh draws the pack-thread, and that the cord, which gives them notice what to do. By this means, they ſometimes draw up half a dozen, and very commonly two or three at a draught.

Salmon FISHING. See the articles FISHERY and SALMON.

Sturgeon FISHING. See the article FISHERY and STURGEON.

Tench-FISHING, is beſt performed with large red worms, at which they will bite the more eagerly, if dipped in tar. Several other ſorts of worms, and a paſte made of brown bread, are alſo uſed for this purpoſe.

Trout-FISHING. The baits for this purpoſe are either natural or artificial, as earth worms, minnows, and fiſhing flies, both natural and artificial. Whatever worms are uſed, they anſwer beſt if kept ſome time in an earthen pot, with moſs often changed in ſummer. If you fiſh for trout with hand on the ground, the hook is to be introduced into the worm a little above the middle, coming out again a little below; then draw the worm above the arming of the hook, making your firſt entrance at the tail-end, that the point of the hook may come out at the head-end. When you fiſh with minnows, take the whiteſt and middle-ſized; and after putting the hook in at the mouth, and out at the gills, and drawing it thro' about three inches, ſlip it again into his mouth, ſo as the point and beard may come out at the tail. This done, tie the hook and tail together with a fine white-thread, and let the body of the minnow be almoſt ſtraight upon the hook.

FISSURE *of the bones*, in ſurgery, is when they are divided either tranſverſely or longitudinally, not quite through, but cracked after the manner of glaſs, by any external force. Fiſſures are not eaſily detected, ſince neither the ſenſes of ſeeing, feeling, or hearing can give light enough to determine any thing with certainty in this caſe. However, ſurgeons always ſuppoſe there is a fiſſure when there happens violent inflammations, ſuppurations, fiſtulæ, and caries, with exceſſive pain, after any external violence. When, from theſe ſymptoms, there appears to be a fiſſure, it is uſual to apply the plaſter uſed in fractures, placing ſplints above all. When the tumour becomes ſoft, it is to be laid open by inciſion, to let out the corrupted fluid; after which a tent ſhould be put into the wound, dipped in ſome vulnerary unguent, uſing afterwards the bandage, which is applied in fractures accompanied with a wound. Some aſſert, that fiſſures, when juſt made, may be cured by the application of bandages, without the aſſiſtance of other remedies. In fiſſures of the cranium, attended with no other bad ſymptoms, but white, yellow, or brown ſpots upon the face of the bone, it is ſufficient to bore down to the diploe, and dreſs with ſome balſamic medicine; but where any violent ſymptoms come on, which ſhew that there is an extravaſation of blood in the cavity of the cranium, the trepan is to be called in without delay. See the articles CONTRA-FISSURE and EXTRAVASATION.

FISTULA, in the antient muſic, an inſtrument of the wind kind, reſembling our flute, or flageolet. See FLUTE.

The principal wind-inſtruments of the antients, were the tibia and fiſtula. But how they were conſtituted, wherein they differed, or how they were played on, does not appear.

FISTULA, in ſurgery, a deep, narrow, and callous ulcer, generally ariſing from abſceſſes. See the article ABSCESS.

Fiſtulas differ from ſinuſes in this, that the former are callous, the latter not. See the article SINUS.

Fiſtulas attack all parts of the body without exception, particularly the anus, the perinæum, and the foramen lacrymale.

General treatment of FISTULAS. As ſoon as you diſcover that ulcers are attended with fiſtulas, not yet become callous, the readieſt way of curing them is to lay them open with the knife, to the very bottom, if it can be done with ſafety; and afterwards to cleanſe and heal them: but if the patient will not agree to the uſe of the knife, let the fiſtula be cleanſed with a proper injection. Tents ſhould never be made uſe of, but where the opening of the fiſtula is ſo ſmall as to be in conſtant danger of healing: and even in this caſe, the tent can ſcarcely be too ſhort, nor the materials too ſoft.

The next thing to be obſerved is, to preſs the fundus as near the opening as poſſible. When the ulcer is cleanſed, and the proper dreſſings applied, a ſmall compreſs or a ſlip of plaſter, doubled in that form, ſhould be clapped upon the part where you judge the fundus of the fiſtula to be ſeated, ſecuring all with a bolſter, plaſter, and bandage; taking care to make the faſtenings tight upon the fundus: this will direct the matter contained within towards the opening, and the bottom will heal before the reſt of the fiſtula.

If this method of cure is unequal to the intention of cleanſing and healing, the knife is of the utmoſt ſervice, eſpecially if the fiſtula tends downwards, or takes ſuch an irregular courſe, that the fundus cannot be preſſed towards the opening. All the ſinuſes of the fiſtula being laid open by this operation, there is a paſſage made for a diſcharge of the corrupted matter, and then you can come at the diſeaſed parts with your remedies.

Fistula *in the anus*, is a ſinuous ulcer, commonly ariſing from a phyma, or the internal hæmorrhoides. Fiſtulas which ariſe from the phyma are the worſt, very painful, and hard to be cured, on account they penetrate deep into the interſtices of the muſcles, and then form ſinuſes; and the more remote the ſinuſes are from the anus, ſo much the worſe, in regard they admit of no opening by inciſion.

Fiſtulas ariſing from the internal hæmorrhoides, are bred gradually betwixt the coats of the inteſtinum rectum, and have a ſmall perforation near the verge of the anus; from whence there iſſues out a thin ſanies, or ichor, without pain: but in proceſs of time, the parts are attended with itching and excoriation, the orifices at laſt become callous, and ſometimes for a time are ſhut up; and then at certain intervals break out again.

Unleſs theſe fiſtulas are attended with great moleſtation, ſuch as an exorbitant evacuation of humours, with a fœtor, or the like, they are in a great meaſure to be left to nature to be cured, as ſerving in manner of a drain, for the diſcharge of ſuperfluous, peccant humours, in cacochymical and cachectical bodies: theſe ſhould rather be kept open; but ſimple fiſtulas, that are recent, may be cured without danger. When a fiſtula in the anus is ſo conditioned, that an operation may be performed without danger of injuring the ſphincter muſcle, ſo as to render it incapable of retaining the excrements, there are two ways of doing it, *viz.* either by a ligature, or inciſion.

By ligature it is to be done thus. Let the ſurgeon take a thread of ſilk, or ſome horſe-hair, and thread it into the eye of a leaden, or tin probe, with which let him introduce the end of the thread into the fiſtula, and with the fore-finger of the other hand, being anointed with oil of roſes, and thruſt up into the anus, let him lay hold of the end of the probe, and draw forth the thread, and then tie the two ends together, as tight as the patient can well bear it; and thus by tying it afreſh every day, ſomewhat ſtraiter, it will cut quite through, and the fiſtula will be laid open; and after that the callus muſt be deſtroyed, and the ulcer healed, *&c.*

A more expeditious way is by making an inciſion with an inſtrument, after this manner. A hollow leaden probe is to be thruſt into the fiſtula, till it penetrates into the inteſtinum rectum; and then the inſtrument being paſſed into the anus, with the guidance of a finger, the fiſtula is to be cut according to the direction of the conductor, yet taking care not to hurt the hæmorrhoid veins, to occaſion an hæmorrhage. When the inciſion is made, a doſſil is to be put in armed with the white of an egg, and aſtringent powders: the callus is to be deſtroyed with a powder made of burnt alum, præcipitate mercury, *&c.*

Fistula *in the perinæum*, is uſually the conſequence of lithotomy, or making a puncture in the perinæum and bladder; or they may proceed from abſceſſes in the perinæum, near the urethra; or from a ſcirroſity of the proſtate gland; or from a wound, or ulcer, which can by no means be healed up, but the lips, becoming callous, form a fiſtula, through which the urine is ſometimes preternaturally diſcharged.

The treatment of theſe fiſtulas is various, according to the habit and particular diſpoſition of the parts affected. The general treatment is as follows. Let the callous lips of the fiſtula be cut off, and the parts brought together by a ſticking plaſter, after they have been dreſſed by ſome vulnerary balſam; over the plaſter ſhould be laid a narrow compreſs, on each ſide of the wound, and the whole retained by a ſtrict bandage; which done, the patient's knees are to be tied together, and ſtrict orders given him, to lie ſtill in bed, that the lips of the wound may more eaſily unite with each other. For the firſt few days after the operation, the patient ſhould be allowed very little drink, that he may not be often excited to make water, and the dreſſings ſhould not be removed till the ſecond or third day after the operation, or till the patient can contain his urine. For ſome time afterwards the patient muſt obſerve a ſtrict regimen.

Fistula lachrymalis, a diſeaſe which attacks the great caruncle in the inward corner of the eye. See the article Eye.

The firſt degree of this diſeaſe ſtops up the natural paſſage of the tears, and forces them to run down the cheek; the ſecond is when pus is mixed with the tears, which proceeds ſometimes from an opening in the ſkin, between the noſe and the great corner of the eye; the laſt is when the pus has not only corroded the neighbouring parts, which are ſoft, but has affected the bone which lies underneath. This laſt ſort of fiſtula ſometimes turns cancerous, and Riverius adviſes not to meddle with it at all.

Whatever may be the cauſe of this diſorder, whether the ſmall-pox, or french diſeaſe, it always ſtops up the naſal conduit.

If the abſceſs is not open, a time muſt be choſen when it is fulleſt of pus. For this reaſon, the eye of the patient muſt be cloſed, and ſmall long pieces of plaſter muſt be put one upon another, acroſs the eye-lids, from the puncta lachrymalia to the great angle of the eye. The ſuperior branches of the canal being thus compreſſed, that nothing can paſs that way, it will be amaſſed in the ſack, and a place proper for an inciſion ſhould then be pointed out. If the abſceſs is already open the orifice and the probe will ſhew where it is to be dilated, which muſt be done by the biſtory, both above and below, from the ſuperior part of the ſack to the edge of the orbit. The ſack being opened, it muſt be filled with dry lint, which may be taken away next day, and a pledgit dipt in a mild digeſtive applied, which muſt be repeated once or twice a day, according to the quantity of ſuppuration: when the ſuppuration begins to diminiſh at every dreſſing, a ſmall probe muſt be introduced into the naſal canal, to dilate it a little, and to leave a paſſage for the tears and the pus. This method muſt be continued till the ſuppuration is almoſt ended, then it may be dreſſed ſuperficially, with dry lint, or with a deſiccative, which will complete the cure: after which it will be proper to wear a compreſſing bandage a few weeks longer to prevent its return. When the bone lies open, and it is neceſſary to penetrate into it, you muſt direct the inſtrument towards the noſe, and not towards the naſal canal, for fear of entering the ſinus maxillaris.

FISTULAR, or Fistulous, appellations given by ſurgeons to wounds and ulcers, which degenerate into fiſtulas. See the article Fistula.

Fistular, among botaniſts, is applied to leaves and flowers that are tubular, or reſemble a hollow pipe.

FIT, in medicine, denotes much the ſame with paroxyſm. See Paroxysm.

Fits *of eaſy reflection and tranſmiſſion*, in optics. See the articles Reflection and Transmission.

Fits *of the mother*, the ſame with hyſteric affection.

FITCHEE', in heraldry, a term applied to a croſs, when the lower end of it is ſharpened into a point, as in plate XCVIII. fig. 3.

Croſſes are ſometimes fitched by only a point going out from the broad foot thereof, and ſometimes they go tapering away from the center to the point, in which caſe it is ſaid to be fitcheé on the fourth part. The reaſon of this croſs's being ſo painted, Mackenzy ſuppoſes to be, that as the primitive Chriſtians were wont to carry croſſes with them whereſoever they went for devotion, when they ſettled themſelves in their journey, at any place, they might fix theſe portable croſſes in the ground.

FITCHES, in huſbandry, a ſort of pulſe, more generally known by the name of chick-pea, or cicer. See the article Cicer.

Fitches are cultivated either for feeding cattle, or improving the land. They make a wholſome and nouriſhing food, whether given in the ſtraw, or thraſhed out. When ſown only to improve the ſoil, they are plowed in juſt as they begin to bloſſom, by which means a tough ſtiff clay ſoil is much enriched.

FITZ, makes part of the ſurname of ſome of the natural ſons of the kings of England, as Fitz-roy; which is purely French, and ſignifies the king's ſon.

FIVE CHURCHES, a biſhop's ſee of Lower Hungary, 76 miles ſouth of Buda.

FIVES, or VIVES, in farriery. See the article VIVES.

FIUME, or *St.* VEIT, a port-town of Iſtria, ſubject to the houſe of Auſtria: eaſt long. 15°, and north lat. 45° 45′.

FIXATION, in chemiſtry, the rendering any volatile ſubſtance fixed, ſo as not to fly off upon being expoſed to a great heat; hence,

FIXED BODIES are thoſe which bear a conſiderable degree of heat without evaporating, or loſing any of their weight.

Gold is the moſt fixed of all metals. A quantity of very pure gold, after being placed in the eye of a glaſs furnace for two months, was found not to have loſt any ſenſible part of its weight.

However, gold itſelf, expoſed on a piece of charcoal to the focus of a burning-glaſs is found to diminiſh; and, in proportion to this diminution, there ariſe an infinite number of little glaſſy drops of a greeniſh colour, which ſwell and enlarge as the gold diſappears. But this, ſay ſome, is no demonſtration that the gold is vitrified: it is rather the aſhes of the coal; becauſe, if the gold be evaporated on a body which yields no aſhes, you have no glaſs. Be this as it will, the experiment ſhews that gold may be evaporated; and ſince gold is not fixed, we may ſafely conclude, that there is no body abſolutely ſo. See the articles GOLD and BURNING-GLASS.

FIXED MERCURY,	See	MERCURY.
FIXED NITRE,		NITRE.
FIXED SALTS,		SALT.
FIXED SIGNS,		SIGN.
FIXED STARS,		STAR.

FLACCIDITY, among phyſicians, a diſorder of the ſolids, cured by aſtringent and cardiac medicines, joined with exerciſe and good air.

FLAG, a general name for colours, ſtandards, antients, banners, enſigns, &c. which are frequently confounded with each other. See COLOUR, &c.

The faſhion of pointed, or triangular flags, as now uſed, Rod. Toletan aſſures, came from the mahometan Arabs, or Saracens, upon their ſeizing of Spain, before which time all the engines of war were ſtretched, or extended on croſs pieces of wood, like the banners of a church. The pirates of Algiers, and throughout the coaſts of Barbary, bear an hexagonal flag.

FLAG is more particularly uſed at ſea; for the colours, antients, ſtandards, &c. borne on the tops of the maſts of veſſels, to notify the perſon who commands the ſhip, of what nation it is, and whether it be equipped for war or trade. See plate XCIX.

The admiral in chief carries his flag on the main top; the vice-admiral on the fore-top; and the rear admiral on the mizzen-top.

When a council of war is to be held at ſea, if it be on board the admiral, they hang a flag in the main ſhrouds; if in the vice-admiral, in the fore-ſhrouds; and if in the rear-admiral, in the mizzen ſhrouds.

Beſides the national flag, merchant-ſhips frequently bear leſſer flags on the mizzen maſt, with the arms of the city where the maſter ordinarily reſides; and on the fore-maſt, with the arms of the place where the perſon who freights them lives.

FLAG, in french fanion, a ſmall banner of diſtinction ſtruck in the baggage-waggons of the army, to diſtinguiſh the baggage of one brigade, or battalion, from that of another, that they may be marſhalled by the waggon-maſter-general according to the rank of their brigades, where they are to keep during the march to avoid confuſion.

To lower, or ſtrike the FLAG, is to pull it down upon the cap, or to take it in, out of the reſpect, or ſubmiſſion, due from all ſhips or fleets inferior to thoſe any way juſtly their ſuperiors. To lower or ſtrike the flag in an engagement is a ſign of yielding.

The way of leading a ſhip in triumph is to tie the flags to the ſhrouds, or the gallery, in the hind part of the ſhip, and let them hang down towards the water, and to tow the veſſels by the ſtern. Livy relates, that this was the way the Romans uſed thoſe of Carthage.

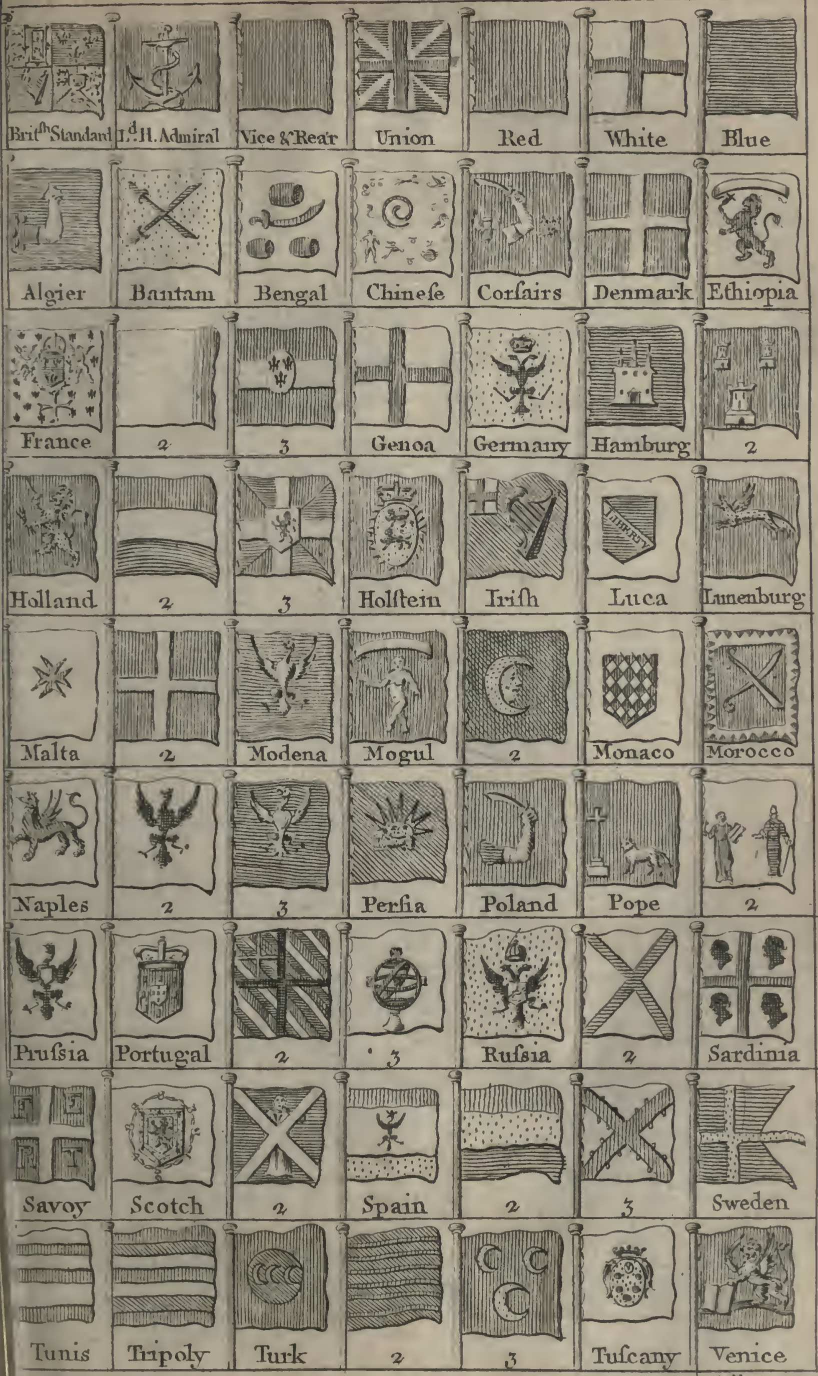
To heave out the FLAG, is to put out, or put abroad, the flag.

To hang out the white FLAG, is to aſk quarter; or it ſhews when a veſſel is arrived on a coaſt, that it has no hoſtile intention, but comes to trade, or the like. The red flag is a ſign of defiance, and battle.

FLAG-OFFICERS, thoſe who command the ſeveral ſquadrons of a fleet, ſuch are the admirals, vice-admirals, and rear-admirals.

The flag-officers in our pay, are the admiral, vice-admiral, and rear-admiral, of

FLAGS



T. Jefferys sculp

of the white, red, and blue. See the article ADMIRAL.

FLAG-SHIP, a ſhip commanded by a general or flag-officer, who has a right to carry a flag, in contradiſtinction to the ſecondary veſſels under the command thereof.

FLAG-STAVES, are ſtaves ſet on the heads of the top-gallant-maſts, ſerving to let fly, or unfurl, the flag.

FLAGS, in falconry, are the feathers in a hawk's wing, near the principal ones.

FLAG is alſo uſed for ſedge, a kind of ruſh; and for the upper part of turf, pared off to burn.

FLAG-FLOWER, in botany, a plant called by botaniſts iris. See the article IRIS.

FLAG-WORM, that found in flaggy or ſedgy places. See the article WORM.

Corn-**FLAG**, in botany, the ſame with gladiolus. See the article GLADIOLUS.

Sweet ſcented **FLAG**, a name ſometimes given to the acorus of galangal. See the article GALANGAL.

FLAGELLANTES, WHIPPERS, in church-hiſtory, certain enthuſiaſts in the thirteenth century, who maintained, that there was no remiſſion of ſins without flagellation, or whipping. Accordingly, they walked in proceſſion, preceded by prieſts carrying the croſs, and publicly laſhed themſelves, till the blood dropped from their naked backs.

FLAGELLARIA, in botany, a genus of the hexandria monogynia claſs of plants, without any flower-petals; the perianthium is divided into ſix ſegments; and the fruit is a roundiſh berry, containing a ſingle ſeed.

FLAGEOLET, or FLAJEOLET, a little flute, uſed chiefly by ſhepherds, and country people. It is made of box, or other hard wood, and ſometimes of ivory, and has ſix holes beſides that at the bottom, the mouth-piece, and that behind the neck. See the article FLUTE.

FLAIL, an inſtrument for thraſhing corn. See CORN and THRASHING.

A flail conſiſts of the following parts, 1. The hand-ſtaff, or piece held in the thraſher's hand. 2. The ſwiple, or that part which ſtrikes out the corn. 3. The caplins, or ſtrong double leathers, made faſt to the tops of the hand-ſtaff and ſwiple. 4. The middle-band, being the leather-thong, or fiſh-ſkin, that ties the caplins together.

FLAIR, in the ſea-language. When a ſhip is houſed in near the water, ſo that the work above hangs over too much, it is ſaid to flair over. This makes the ſhip more roomy aloft, for the men to uſe their arms.

FLAIRE, a ſpecies of ray-fiſh, more uſually called ſkate. See the article SKATE.

FLAKE, among gardeners, a kind of ſtriped carnations, with only two colours.

FLAMBEAU, a kind of large taper, made of hempen wicks, by pouring melted wax on their top, and letting it run down to the bottom. This done, they lay them to dry; after which they roll them on a table, and join four of them together by means of a red-hot iron; and then pour on more wax, till the flambeau is brought to the ſize required.

Flambeaus are of different lengths, and made either of white or yellow wax. They ſerve to give light in the ſtreets at night, or on occaſion of illuminations.

FLAMBOROUGH-HEAD, in geography, a cape or promontory of Yorkſhire, five miles eaſt of Burlington: eaſt long. 20′, north lat. 54° 15′.

The village of Flamborough has its name, as ſome think, from the word flame, becauſe of a watch-tower here, with lights for the uſe of ſailors.

FLAME, *flamma*, in phyſiology, the ſmall parts of an inflammable or conſiderably unctuous body, that are ſet on fire, or briſkly agitated or thrown off, with a certain vibrative motion at the ſurface of that body into the open air: or in Sir Iſaac Newton's words, the flame of a body is only the ſmoke thereof heated red hot; and the ſmoke is only the volatile part of the body ſeparated by the fire. See FIRE and SMOKE.

Flame cannot exiſt without oil; whence it is that aſhes, ſand, glaſs, ſtones and earth, do not flame upon ignition, but rather damp and extinguiſh flame. As oil is then the only inflammable ſubſtance in nature, we may be directed to the means of preventing conflagrations, by uſing ſuch materials in building as contain little or no oil. And this direction might be likewiſe extended to the making incombuſtible paper, for valuable books and manuſcripts, &c.

All flame catches and exiſts only on the ſurface of inflammable bodies: whence we are led to invent methods of caſing or otherwiſe defending the wood-works of ſhips and buildings, from accidents by fire.

All inflammable bodies, as ſulphur, oil, wax, wood, &c. by flaming, waſte and vaniſh into burning ſmoke; which ſmoke, if the flame be haſtily put out, is very thick and viſible, and ſometimes ſmells ſtrongly; but in the flame, loſes its ſmell by burning; and according to the nature of the ſmoke, the flame is of this or that colour: thus the flame of ſulphur is blue; that of camphor, white; that of tallow, yellow, &c. When gun-powder takes fire, it goes off in a flaming ſmoke. Thence proceeds the difference of the colours of bodies, as viewed by day light, candle-light, fire-light, ſulphureous-light, &c.

As the preſſure of the fire is greateſt about the upper parts, and leaſt towards the circumference of the baſe, whence the air finding leaſt reſiſtance from that part, drives the flame upwards; and as the fire is denſeſt, and conſequently ſtrongeſt, about the middle, it thence follows, that the flame will riſe higher from the middle of the fire than from its ſides, where the quantity of fire is conſiderably leſſened; and hence we ſee the reaſon of the pyramidal figure of flame.

Vital FLAME, a fine, warm, igneous ſubſtance, ſuppoſed, by ſome, to reſide in the hearts of animals, as neceſſary to life; or rather as that which conſtitutes life itſelf.

To preſerve this flame, they judge the air taken in by reſpiration, to be as neceſſary as it is to the conſervation of ordinary flame. Others, however, not leſs to be depended on, find no more in the notion of a vital flame, than the natural warmth of the body, which is always as the velocity of the circulating blood, and is the effect of that circulation.

FLAMEN, in roman antiquity, the name of an order of prieſts, inſtituted by Romulus or Numa; authors not being agreed on this head.

They were originally only three, *viz.* the flamen dialis, flamen martialis, and flamen quirinus. They were choſen by the people, and inſtalled by the ſovereign pontiff. Afterwards, their number was increaſed to fifteen; the three firſt of whom were ſenators, and called flamines majores; the other twelve, taken from among the people, being denominated flamines minores.

The flamen dialis, or prieſt of Jupiter, was a conſiderable perſon at Rome; the flamen martialis, or prieſt of Mars, was the ſecond in dignity; and the flamen quirinalis, was the next to him.

The greater flamens wore the robe edged with purple, like that of the great magiſtrates, had an ivory-chair, and ſat in the ſenate. They wore a little band of thread (flamen) about their head; from whence, according to Varro, they had their name.

There were likewiſe flaminicæ, or prieſteſſes, who were the wives of the flamines diales. Theſe wore a flame-coloured habit, on which was painted the image of a thunder-bolt; and above their head-dreſs, they wore green oak boughs. They are often mentioned in inſcriptions.

FLAMINGO, in ornithology, a bird otherwiſe called phœnicopterus. See the article PHOENICOPTERUS.

FLAMMULA, in antiquity, a kind of flag, ſo called from its pointed figure. It was painted of different colours, to diſtinguiſh the ſeveral battalions and companies from each other.

FLANCH, FLANQUE, or FLASQUE, in heraldry, an ordinary always borne double; being the ſegment of a circular ſuperficies.

FLANDERS, a province of the Netherlands, bounded by the German ſea and the United provinces, on the north; by the province of Brabant, on the eaſt; by Hainault and Artois, on the ſouth; and by another part of Artois and the German ſea, on the weſt; being about ſixty miles long, and fifty broad, and divided between the Auſtrians, the French, and the Dutch.

Flanders is a perfectly champaign country, with not a riſing ground or hill in it, and watered with many fine rivers and canals. Its chief commodities are fine lace, linen, and tapeſtry.

FLANEL, or FLANNEL, a looſe ſort of woollen ſtuff, not croſſed, and wove on a loom, with two treddles, like baize.

FLANK, in the manege, the ſide of a horſe between the ribs and haunches. A well flanked horſe, is one that has wide and well made ribs, and a good body.

FLANKS *of an army*, are the troops encamped on the right and left, as the flanks of a battalion are the files on the right and left.

FLANK *of a baſtion*, in fortification, that part which joins the face to the curtin. See the article BASTION.

Engineers differ very much about raiſing the flank, ſome making it perpendicular to the face, ſome to the curtin, and others to the line of defence; ſome again make it an angle of 98° with the curtin, whereas Vauban makes it the chord of a ſegment, whoſe center is the angle of the ſhoulder of the next baſtion. Its uſe is to defend the curtin, and the flank and face of the oppoſite baſtion; to defend the paſſage of the moat; batter the ſalliant angles of the counterſcarp and glacis, from whence the beſiegers ruin the flanks with their artillery, in order to take away the defence of the oppoſite baſtion.

Oblique FLANK, or *ſecond* FLANK, that part of the curtin, from whence the face of the oppoſite baſtion may be diſcovered.

Retired FLANK, or *low* FLANK, or *covered* FLANK, one of the platforms of the cazemate. See article CAZEMATE.

Theſe retired flanks are a great defence to the oppoſite baſtion, and to the paſſage of the moat, becauſe the beſiegers cannot ſee nor eaſily diſmount their guns. The curtin is eſteemed the ſtrongeſt part of a fortification, becauſe flanked at both ends; and the face is accounted the weakeſt, as having only one defence from the oppoſite flank.

FLANKED, *flanquée*, in heraldry, is uſed by the French to expreſs our parti per ſaltier.

Coats, however, makes it to be the ſame with flanch. See the article FLANCH.

FLANKED ANGLE, in fortification, that formed by the two faces of a baſtion.

FLANKING ANGLE, or *angle of the* TENAILLE, that compoſed of the two lines of defence, and pointing towards the curtin. See the article TENAILLE.

FLANKING *line of defence*. See the article LINE *of defence*.

FLASK, a horn, or the like, made for carrying of powder, having a meaſure for the charge of the piece for the top.

FLAT, in the ſea-language. To flat in the fore-ſail, is to hail it in by the ſheet, as near the ſhip's ſide as poſſible; which is done, when a ſhip will not fall off from the wind.

FLATS, in muſic, a kind of additional notes, which, together with ſharps, ſerve to remedy the defects of muſical inſtruments, wherein temperament is required. See TEMPERAMENT and SHARP.

The natural ſcale of muſic being limited to fixed ſounds, and adjuſted to an inſtrument, the inſtrument will be found defective in many points; and particularly, in that we can only proceed from any note by one particular order of degrees; that for this reaſon, we cannot find any interval required, from any note upwards or downwards; and that a ſong may be ſo contrived, as that if it be begun by any particular note or letter, all the intervals, or other notes, ſhall be juſtly found on the inſtrument, or in the fixed ſeries; yet were the ſong begun with any other note, we could not ſo proceed. See the articles SCALE and INTERVAL.

To remove or ſupply this defect, muſicians have recourſe to a ſcale proceeding by twelve degrees, that is thirteen notes to an octave, including the extremes; which makes the inſtrument ſo perfect, that there is but little reaſon to complain. This, therefore, is the preſent ſyſtem or ſcale for inſtruments that have their ſounds fixed, *viz.* betwixt the extremes of every tone of the natural ſcale, is put a ſound or note, which divides it into two unequal parts, called ſemi-tones: hence the whole may be called the ſemitonic ſcale, containing twelve ſemi-tones betwixt thirteen notes, in the compaſs of an octave.

Now to preſerve the diatonic ſeries diſtinct, theſe inſerted notes either take the name of the natural note next below, with the character ♯, called a ſharp; or the name of the natural note next above it, with the character ♭, called a flat. Thus D♭, or D flat, ſignifies a ſemi-tone below D natural; and it is indifferent, in the main, whether the inſerted note be accounted as a flat or ſharp.

This ſemi-tonic ſeries, or ſcale, is very exactly repreſented by the keys of the organ, *&c.* the lowermoſt range of keys being the natural or diatonic notes; and thoſe behind, the artificial ones, or the flats and ſharps.

FLATTING, in gilding, is the giving the work a light touch, in the places not burniſhed, with a pencil dipt in ſize, in which a little vermilion is ſometimes mixt. This ſerves to preſerve and prevent its flawing, when handled. See GILDING.

FLATULENCY, in medicine, a diſorder of the bowels ariſing from a weak ſtomach, and crude flatulent aliment, as peaſe, beans, lentiles, coleworts, hard fat fleſh, and the like; which degenerate into wind, creating great anxiety if not evacuated, and difficulty of breathing.

Another cauſe of flatulencies are congeſtions of blood in the branches of the vena porta; whence proceed anxieties of the præcordia, difficult breathing, colic pains, heart-burn, head-achs, vertigo, and watchfulneſs.

If the flatulencies ariſe from crudities in the ſtomach, evacuations are firſt of all neceſſary; after which may be given bitters, aromatics, carminatives, and ſtrengtheners, with a ſpare diet and exerciſe. If it proceeds from congeſtions of blood, as is the caſe of hypochondriacs, a vein muſt be opened; and if the body is coſtive, an emollient clyſter or a gentle laxative will be proper. If theſe fail, chalybeate medicines are to be called in, as tincture of vitriol of iron, ſteel-filings finely powdered, from ſix to ten grains, or oil of cinnamon with ſugar or bitters, ſpaw-waters, and conſtant exerciſe.

FLATULENT TUMOURS, in ſurgery. See the article PNEUMATOCELE.

FLAUTINO, in muſic, the ſame with flageolet. See the article FLAGEOLET.

FLAW, in the ſea-language, ſignifies a ſudden guſt of wind.

FLAX, *linum*, in botany. See LINUM.

Flax is an excellent commodity, and the cultivation of it a good piece of huſbandry. It will thrive in any ſound land, but that which has lain long fallow is beſt; which being well plowed, and laid flat and even, the ſeeds muſt be ſown in a warm ſeaſon, about the middle or end of March, or at fartheſt the beginning of April; and if a wet ſeaſon happen, weeding will be neceſſary. The beſt ſeed is that brought from the eaſt country, which, tho' dear, yet eaſily repays the charge: this will laſt two or three crops, when it is adviſeable to renew the ſeeds again. Of the beſt ſeed, two buſhels may ſerve for an acre; but more muſt be allowed of home-ſeed, becauſe it grows ſmaller. When grown up, it ought not to be gathered before it be fully ripe; for if pulled before the bloſſom falls, it hackles away almoſt to nothing; and, tho' in appearance very fine, yet it has no ſubſtance, and the yarn ſpun of it is weak and ouzy: it not only waſtes in the waſhing, but the linen made of it grows extremely thin in the bleaching. The pluckers ſhould be nimble, tie it up in handfuls, ſet them up till perfectly dry, and then houſe them. Flax pulled in the bloom, proves whiter and ſtronger than if left ſtanding till the ſeed is ripe; but then the ſeed will be loſt. An acre of good flax, is accounted worth from ſeven to twelve pounds, or more.

Dreſſing of FLAX. When flax has been watered, and twice ſwingled, as directed under the articles WATERING and SWINGLING, it is then to be heckled in a much finer heckle than that uſed for hemp. Hold the ſtrike of flax ſtiff in your hand, and break it very well upon the coarſe heckle; ſaving the hurds to make harden cloth of. This done, the ſtrike is to be paſſed through a finer heckle, and the hurds coming from thence ſaved for middling cloth, and the tear itſelf for the beſt linen.

But to dreſs flax for the fineſt uſe of all, after being handled as before, and laying three ſtrikes together, plat them in a plat of three rows, as hard and cloſe together as you can; joining one to the end of another, till you have platted as much as you think convenient: then begin another plat, and add as many ſeveral ones, as you think will make a roll; afterwards wreathing them hard together, make up the roll; which done, put as many as you judge convenient into a hemp-trough, and beat them ſoundly, rather more than leſs than you do hemp. Next open and unplat them, dividing each ſtrike very carefully from each other; and ſo ſtrike it through the fineſt heckle of all, whereof there are three ſorts. Great care muſt be taken to do this gently and lightly, leſt what is heckled from thence ſhould run to knots; for if preſerved ſoft like cotton, it will make very good linen, each pound running at leaſt two yards and an half. The tear itſelf, or fineſt flax, will make a ſtrong and very fine holland, running at leaſt five yards in the pound. See SPINNING.

In Scotland, they have a lint-mill, which greatly facilitates the dreſſing of flax; which if done by the hand, will coſt 32d. the ſtone; whereas it may be dreſſed at the mill for 2s. the ſtone, which is one fourth ſaved.

Laws regarding FLAX *and hemp*. Any perſon may ſet up the trade of breaking, heckling, and dreſſing of flax or hemp; alſo of ſpinning, weaving, making, whitening, *&c.* cloth made of hemp or flax only; and that in all places, corporate or incorporate, privileged or not. Foreigners uſing the foreſaid trade for three years, ſhall, upon taking the oaths to the government, enjoy all the privileges of natural ſubjects. Rough or undreſſed flax, imported from abroad, pays no duty; but that which is dreſſed or wrought, pays every hundred weight 4 l. 10 s. $5\frac{25}{100}$ d. whereof, upon exporting it, is drawn back 4 l. 3 s. $3\frac{15}{100}$ d. However, it is to be obſerved, that all manner of flax, wrought or unwrought, may be imported from Ireland free of all duty, provided it be done in britiſh or iriſh bottoms.

Purging-FLAX, *linum catharticum.* See the article LINUM.

FLEA, *pulex*, in zoology, a genus of inſects without wings, of a roundiſh, compreſſed figure: the legs are three pair, and formed for leaping: the eyes are two, and ſimple: the mouth is bent downward: the colour is a deep purple, approaching to black.

The flea is an inſect which infeſts birds, as well as quadrupedes, and lays eggs, called nits: theſe produce a kind of nymphs, or white worms; which after ſome time are transformed, in the manner of caterpillars, into perfect fleas.

FLEA-BANE, in botany, a name given to the plant called by authors conyza. It got the name of flea-bane, from its ſuppoſed virtue of killing fleas. See CONYZA.

African FLEA-BANE, a plant called by botaniſts parthenium. See PARTHENIUM.

Sweet FLEA-BANE, the ſame with the erigeron of botaniſts.

FLEA-BITTEN, that colour of a horſe, which is white or grey, ſpotted all over with dark reddiſh ſpots. See HORSE.

FLEA-WORT, the engliſh name of the pſyllium of botaniſts.

FLEAM, in ſurgery and farriery, an inſtrument for letting a man or horſe blood. A caſe of fleams, as it is called by farriers, comprehends ſix ſorts of inſtruments; two hooked ones, called drawers, and uſed for cleaning wounds; a pen-knife; a ſharp-pointed lancet, for making inciſions; and two fleams, one ſharp and the other broad-pointed. Theſe laſt are ſomewhat like the point of a lancet, fixed in a flat handle, only no longer than is juſt neceſſary to open the vein.

Many of the german ſurgeons let blood with a fleam, repreſented in plate XCVIII. fig. 4. They hold the part B in their hand; and, applying the point A to the vein, ſtrike the part C with one of the fingers of the other hand. Others uſe a neater inſtrument, or ſpring-fleam, repreſented, *ibid.* n° 2. This being drawn up, they apply the point A to the vein, and then let it go by preſſing upon B. However, as the poſition and ſize of the veins are different in different perſons, the lancet is found to be the moſt convenient inſtrument for this purpoſe. See the article LANCET.

Fleams imported, beſides the duty on ſteel, pay each $\frac{38\frac{1}{2}}{100}$ d. and draw back on exportation $\frac{34\frac{3}{4}}{100}$ d. See STEEL.

FLECHE, a town of France, under the meridian of London, twenty miles north-eaſt of Angers.

FLEECE, the covering of wool, ſhorn off the bodies of ſheep. See WOOL.

Order of the golden FLEECE, an order of knighthood inſtituted by Philip II. duke of Burgundy. Theſe knights at firſt were twenty four, beſides the duke himſelf, who reſerved the nomination of ſix more: but Charles V. encreaſed them to fifty. He gave the guardianſhip of this order to his ſon Philip king of Spain, ſince which the Spaniſh monarchs are chiefs of the order. The knights had three different mantles ordained them at the grand ſolemnity, the collar and fleece.

FLEET, commonly implies a company of ſhips of war, belonging to any prince or ſtate: but ſometimes it denotes any number of trading ſhips, employed in a particular branch of commerce.

In ſailing, a fleet of men of war is uſually divided into three ſquadrons; the admiral's, the vice-admiral's, and the rear-admiral's ſquadron, all which, being diſtinguiſhed by their flags and pendants, are to put themſelves, and, as near as may be, to keep themſelves in their cuſtomary places, *viz.* The admiral, with his ſquadron, to ſail in the van, that ſo he may lead the way to all the reſt in the day-time, by the ſight of his flag in the main-top-maſt-head; and in the night-time, by his lights or lanterns. The vice admiral and his ſquadron, is to ſail in the center, or middle of the fleet, the rear-admiral, and the ſhips of his ſquadron, to bring up the rear. But ſometimes other diviſions are made, and thoſe compoſed of the lighter ſhips and the beſt ſailors, are placed as wings to the van, center, and rear. See the articles SQUADRON, ADMIRAL, FLAG, *&c.*

For the diſpoſition of a fleet in time of a ſea-engagement or battle, ſee the article BATTLE.

Merchant-fleets generally take their denomination from the place they are bound to, as the Turky fleet, Eaſt-India fleet, *&c.* Theſe, in time of peace, go in fleets for their mutual aid and aſſiſtance: in time of war, beſides this ſecurity, they likewiſe procure convoys of men of war, either to eſcort them to the places whither they are bound, or only a part of the way, to a certain place or latitude, beyond which they are judged out of danger of privateers, &c. See the article CONVOY.

FLEET is alſo a noted priſon in London, where perſons are committed for contempt of the king and his laws, particularly of his courts of juſtice: or for debt, where any perſon will not, or is unable to pay his creditors.

There are large rules and a warden belonging to the fleet priſon, which had its name from the float or fleet of the river or ditch, on the ſide whereof it ſtands.

FLEMISH, or the FLEMISH TONGUE, is that which we otherwiſe call low Dutch, to diſtinguiſh it from the German, whereof it is a corruption, and a kind of dialect. It differs from the Walloon, which is a corruption of the french language. The Flemiſh is uſed through all the provinces of the Netherlands.

FLEMISH BRICKS, a neat, ſtrong, yellow kind of bricks, brought from Flanders, and commonly uſed in paving yards, ſtables, &c. being preferable for ſuch purpoſes to the common bricks.

FLENSBURGH, a port-town ſubject to Denmark, ſixteen miles north of the city of Sleſwick.

FLESH, *caro*, in anatomy, a ſimilar, fibrous part of an animal body, ſoft and bloody, being that whereof moſt of the other parts are compoſed, and whereby they are connected together: or more properly, it is ſuch parts of the body where the blood veſſels are ſo ſmall, as only to retain blood enough to preſerve their colour red.

The antient anatomiſts reckoned five different kinds of fleſh. 1. Muſculous, fibrous, or fiſtular fleſh; ſuch as is the ſubſtance of the heart and other muſcles. 2. The parenchymous fleſh, as that of the lungs, liver, and ſpleen: but ſince the uſe of glaſſes, it is plainly diſcovered that there is no ſuch thing as a parenchyma, properly ſpeaking, but that all the viſcera, as well as other parts of the body, are vaſcular, and nothing but plexus, or net-work, of ſmall veſſels and canals. 3. Viſcerous, ſuch as the fleſh of the ſtomach and guts. 4. Glandulous, as that of the tonſils, the pancreas, the breaſts, &c. 5. Spurious, ſo they called the fleſh of the lips, gums, the glans of the penis, &c. becauſe it is of a conſtitution different from all the reſt.

The moderns admit only one kind of fleſh, *viz.* the muſcular. Sometimes, however, they apply the term to the glands, which they call, by way of diſtinction, glandulous fleſh.

The fleſh of young animals abounds with a ſoft and nouriſhing juice, but that of the older is more nouriſhing. The juices of old animals are ſpirituous, gelatinous, and agreeable to the taſte, but the fleſh is hard and difficult of digeſtion. The fleſh of wild animals more light and digeſtible than that of tame.

Dr. Hales propoſes to ſalt the fleſhes put on ſhipboard, by injecting hydroſtatically a ſtrong brine into the blood-veſſels of animals, immediately after they are killed.

FLESH, among botaniſts, is all the ſubſtance of any fruit that is between the outer rind and the ſtone; or that part of any root that is fit to be eaten.

FLESH-COLOUR. See CARNATION.

FLEUR DE LISE'E, in heraldry, the ſame with flory. See the article FLORY.

FLEURY, a town of Burgundy, in France, thirty miles north of Chalons.

FLEXIBLE, in phyſics, a term applied to bodies capable of being bent or diverted from their natural figure or direction.

Every flexible body, ſay the ſchoolmen, is porous, and that in ſuch a manner, as that the pores or chambers may become longer or ſhorter; and if any corporeal ſubſtance fills theſe pores, it muſt be conceived ſo ſubtile as to be eaſily expelled by compreſſion, or at leaſt capable of being driven from one chamber to another, according as the body is bent in this or that direction.

FLEXION, in anatomy, is applied to the motion by which the arm or any other member of the body is bent. It is alſo applied to the muſcles, nerves, &c.

FLEXION or FLEXURE *of curves*. See the article FLEXURE.

FLEXOR, in anatomy, a name applied to ſeveral muſcles, which are ſo called from their office, which is to bend the part to which they belong, in oppoſition to the extenſors, which open or ſtretch them, as, 1. Flexors of the head, which are the maſtoidæus, the rectus major anticus, and the rectus minor anticus. 2. Flexors of the neck, *viz.* the ſcalenus and longus. 3. Flexors of the back and loins, the quadratus lumborum, the pſoas parvus, the intertranſverſales lumborum. 4. Flexors of the cubitus, the brachiæus externus, and brachiæus internus. 5. Flexors of the carpus, the radiæus internus, the ulnaris internus, and the palmaris. 6. Flexors of the firſt, ſecond, and third phalanx of the fingers, *viz.* the four lumbricales, the ſublimis or perforatus, and the perforans or profundus. 7. Flexors of the thigh, called alſo elevators, the pſoas magnus, the iliacus, and the pectinæus, called alſo lividus. 8. Flexors of the tibia, the gracilis, the ſemimembranoſus, the ſeminervoſus, the biceps, and the popliſæus. 9. Flexors of the tarſus or foot, the tibialis anticus, and the peronæus anticus. 10. Flexors of the phalanges of the toes, the lumbricales, the perforatus, the perforans, and the flexor longus of the great toe, whoſe origin is in the poſterior part of the fibula, and its termination in the lower part of the laſt phalanx, together with the flexor brevis, the origin of which is from the middle os cuneiforme, and its termination at the two ſeſamoide bones of the great toe, which are joined by ligaments to its firſt phalanx. See MASTOIDÆUS, RECTUS, SCALENUS, BRACHIÆUS, *&c.* *&c.*

FLEXURE *of curves*, in the higher geometry, is uſed to ſignify that a curve is both concave and convex, with reſpect to a given right line A *p*, or a fixed point P, (plate XCVIII. fig. 5. n° 1.). Thus the curve C M D having the part C M concave towards A P or P, and the part M D convex to the ſame, is ſaid to have a flexure: and the point M which limits the concavity and convexity, is called the point of inflexion or contrary flexure. See the article INFLECTION.

This is to be underſtood when the point, ſuppoſed to deſcribe the curve, coming to M, continues its courſe towards the ſame ſide; but if it turn backwards, as in n° 2, 3, 4, *ibid.* the curve may either have a continued curvature, as in n° 4, or have a cuſpis point of reflection or of retrogradation, as in n° 2, 3. As to the method of finding the points of contrary flexure, ſee l'Hoſpital's Anal. inf. Petit. ſect. 4.

FLIGHT, in general, denotes the act of flying. See the article FLYING.

FLIGHT in heraldry. See the article VOL.

FLIGHT *of a ſtair-caſe.* See STAIR-CASE.

FLINGING, in the manege, the ſame with yerking. See the article YERKING.

FLINT, *ſilex*, in natural hiſtory, a ſemipellucid ſtone, compoſed of cryſtal debaſed with earth, of one uniform ſubſtance, and free from veins; but of different degrees of colour, according to the quantity of earth it contains, and naturally ſurrounded with a whitiſh cruſt.

Flint is a ſtone of an extremely fine, compact, and firm texture, and very various, both in ſize and figure. It is of all the degrees of grey, from nearly quite black, to almoſt quite white. It breaks with a fine, even, gloſſy ſurface; and is moderately tranſparent, very hard, and capable of a fine poliſh. It readily ſtrikes fire with ſteel, and makes not the leaſt efferveſcence with aquafortis, and burns to a whiteneſs. Its uſes in glaſs-making, *&c.* are too well known to need a particular recital.

It is not uncommon to find on our ſhores fine, pellucid, flinty bodies, ſtreaked or veined with white, black, brown, *&c.* Theſe are the agates of this country, and anſwer in every particular, but fineneſs, to the gem. See the article AGAT.

The manner of preparing flints for the nicer operations in the glaſs trade, is this: after freeing them from the white cruſts with which they are commonly ſurrounded, calcine them in a ſtrong fire; then powdering them in an iron mortar, ſift the powder through a very fine ſieve: pour upon this powder ſome weak aquafortis, to diſſolve any particles of iron it may have got from the mortar; then, after ſtanding ſome time, waſh it well with hot water, and dry it for uſe.

Oil of FLINTS, a name given to the liquor obtained from a mixture of four ounces of calcined and powdered flints, with twelve ounces of ſalt of tartar: this being melted together in a ſtrong fire, runs into glaſs; which is to be powdered and ſet in a cellar, where it runs into an oil per deliquium.

FLINT-CASTLE, an old town and caſtle, which gives name to Flintſhire, in Wales, is ſituated on the river Dee, ten miles eaſt of St. Aſaph, and ſends one member to parliament: weſt long. 3° 12′, north lat. 53° 20′.

FLIP, a drink common among ſailors, made up of malt-liquor, brandy, and ſugar, mixed together.

FLIX, a town and caſtle of Catalonia, in Spain, twenty miles north of Tortoſa.

FLIX-WEED, a genus of plants called by authors eryſimum. See ERYSIMUM.

FLOAT *of a fiſhing-line*, the cork or quill that floats or ſwims above water. See the article FISHING.

The quills of muſcovy ducks are the beſt floats for ſlow waters, but for ſtrong ſtreams, cork-floats are the beſt; for which purpoſe take a good ſound cork, without flaws or holes, and bore it thro' with a hot iron, into which put a quill of a fit proportion: then pare the cork into a pyramidal form, of what ſize you pleaſe, and then grind it ſmooth.

Float alſo ſignifies a certain quantity of timber bound together with rafters, athwart, and put into a river to be conveyed down the ſtream; and even, ſometimes, to carry burdens down a river with the ſtream.

Float-boards, thoſe boards fixed to water-wheels of under-ſhot mills, ſerving to receive the impulſe of the ſtream, whereby the wheel is carried round. See the article Wheel and Mill.

It is no advantage to have too great a number of float-boards, becauſe, when they are all ſtruck by the water in the beſt manner that it can be brought to come againſt them, the ſum of all the impulſes will be but equal to the impulſe made againſt one float-board at right angles, by all the water coming out of the pen-ſtock through the opening, ſo as to take place on the float-board. The beſt rule in this caſe is to have juſt ſo many, that each of them may come out of the water as ſoon as poſſible, after it has received and acted with its full impulſe. As to the length of the float-board, it may be regulated according to the breadth of the ſtream. See the article Mill.

FLOATAGES, all things floating on the top of the ſea or any water, a word much uſed in the commiſſions of water-bailiffs.

FLOATINGS, in huſbandry, the drowning or watering of meadows.

Floating *of cheeſe*, among houſe-wives, ſeparating the whey from the curd. See the article Cheese.

Floating-bridge. See Bridge.

Floating islands. See Island.

FLOOD, a deluge or inundation of waters: See the article Deluge.

Flood, among ſeamen, is when the tide begins to come up, or the water begins to riſe, then they call it young flood; after which it is a quarter flood, half flood, and high flood. See the article Tide.

Flood-mark, the mrak which the ſea makes on the ſhore, at flowing water, and the higheſt tide: it is alſo called high-water mark.

Sand **Flood.** See Sand Flood.

FLOOK, or **Fluke**, of an anchor. See the article Anchor.

FLOOKING, among miners, a term uſed to expreſs a peculiarity in the load of a mine. The load or quantity of ore is frequently intercepted in its courſe, by the croſſing of a vein of earth or ſtone, or ſome different metallic ſubſtance; in which caſe the load is moved to one ſide, and this tranſient part of the land is called a flooking.

FLOOR, in architecture, the under ſide of a room, or that part we walk on.

Floors are of ſeveral ſorts, ſome of earth, ſome of brick, ſome of ſtone, and ſome of wood.

Earthen floors are commonly made of loam, and ſometimes, when they are deſigned to make malt on, of lime and brook-ſand, and gun-duſt, or anvil-duſt, from the forge.

The manner of making theſe floors for plain country habitations, is as follows. Take two thirds of lime, and one of coal-aſhes well ſifted, with a ſmall quantity of loam clay; mix the whole together, and temper it well with water, making it up into a heap: let it lie a week or ten days: then temper it well over again. After which heap it up for three or four days, and repeat the tempering very high, till it become ſmooth, yielding, tough and glewy. Then the ground being levelled, lay your floor therewith, about two and a half or three inches thick, making it ſmooth with a trowel: the hotter the ſeaſon is the better; and when it is thoroughly dried, it will make the beſt floor for houſes, eſpecially for malt-houſes.

If any would chooſe to have their floors look better, let them take lime made of rag-ſtones, well tempered with whites of eggs, covering the floor about a quarter or half an inch thick with it, before the under flooring be too dry. If this is well done, and thoroughly dried, it will look, when rubbed with a little oil, as tranſparent as metal or glaſs.

For brick and ſtone floors, ſee the article Pavement.

Carpenters, by the word floor, underſtand as well the framed work of timber, as the boarding over it.

Concerning boarded floors, it is to be obſerved, that the carpenters never floor rooms with boards, till the carcaſe of the houſe is ſet up, and alſo is incloſed with walls, leſt the weather ſhould wrong the flooring; yet they generally rough-plane the boards for flooring, before they begin any thing elſe about the building, that they may ſet them by to ſeaſon; which is done by laying them flat upon three or four balks, each board about the breadth of a board aſunder, the whole length of the balks: then, by laying another lay of boards athwart the laſt, and ſo on till they have laid them all in this manner, by which means they lie hollow for the air to play between them.

The beſt way of placing the principal timbers in a floor, is not to lay them over doors or windows, nor too near chimnies: the boards ſhould all lie one way, which is generally the way that you have the beſt viſto.

Floor *of a ſhip* is ſo much of her bottom as ſhe reſts upon, when ſhe reſts on the ground. See the article SHIP.

Such ſhips as have long, and withal broad floors, lie on the ground with moſt ſecurity; and thoſe that are narrow in the floor, cannot be grounded without danger either of being overſet, or at leaſt of hurting their ſides.

FLORAL, in general, ſomething belonging to a flower. See FLOWER.

Thus floral leaves are thoſe found only near flowers.

Floral games, in roman antiquity, annual games inſtituted in honour of the goddeſs Flora, which began to be celebrated on the fourth of the calends of May, or April 28, and were continued to the calends, or firſt of May.

The floralia, or floral games, were celebrated in the Campus Martius, being firſt proclaimed by ſound of trumpet; and during the celebration, the ædiles ſcattered all manner of pulſe among the people. It is alſo ſaid, that during the floralia, harlots danced naked, playing a thouſand laſcivious tricks. They were firſt inſtituted in the 513th year of Rome.

FLORENCE, an archbiſhop's ſee and a city of Italy, ſituated on the river Arno, in Tuſcany, forty-five miles eaſt of Leghorn: eaſt long. 12° 15′, and north lat. 43° 30′.

Florence is one of the moſt elegant towns in Italy, has an univerſity, and is ſix miles in circumference. The ſtatues, paintings, and curioſities in the grand duke's palace are the admiration of travellers.

FRORENTINE, a town of Champaign in France, twenty-eight miles ſouth-weſt of Troyes.

FLORES, FLOWERS. See the articles FLOWER and FLOS.

Flores, in geography, one of the Azores-iſlands, ſubject to Portugal.

Florid style is that too much inriched with figures and flowers of rhetoric.

Longinus uſes the terms *florid* and *affected ſtyle* indifferently, and lays them down as quite contrary to the true ſublime. See the article STYLE.

FLORIDA, in geography, a name firſt given by the Spaniards to all that part of North America which lies north of the gulph of Mexico. However, all that retains the name Florida, at preſent, is the peninſula between the colony of Georgia and Cape Florida, *viz.* between 25° and 30° of north latitude, and between 81° and 85° weſt longitude.

FLORILEGE, *florilegium*, a name the Latins have given to what the Greeks call ανθολογιον, anthology. See the article ANTHOLOGION.

FLORIN, is ſometimes uſed for a coin, and ſometimes for a money of account.

Florin as a coin, is of different values, according to the different metals and different countries where it is ſtruck. The gold florins are moſt of them of a very coarſe alloy, ſome of them not exceeding thirteen or fourteen carrats, and none of them ſeventeen and a half. As to ſilver florins, thoſe of Holland are worth about 1 s. 8 d. thoſe of Genoa were worth 8¼ d. ſterling.

Florin, as a money of account, is uſed by the italian, dutch, and german merchants and bankers, but admits of different diviſions in different places: in Holland it is on the footing of the coin of that name, containing 20 ſtivers. At Frankfort and Nuremberg it is equivalent to 3 s. ſterling, and is divided into creutzers, and pfinnings. At Liege it is equivalent to 2 s. 3 d. At Straſbourg, to 1 s. 8 d. In Savoy, to 11 d. At Genoa, to 8¼ d. And at Geneva, to 6½ d. See the article COIN.

FLORINIANS, *floriniani*, in church-hiſtory, a ſect of heretics, of the IId century, ſo denominated from their leader Florinus, who made God the author of evil. They are a ſpecies of the gnoſtics, but deny the judgment and reſurrection, and hold that our Saviour was not born of a virgin. They were alſo called borborites. See the article BORBORITES.

FLORIST, *floriſta*, according to Linnæus, is an author or botaniſt, who writes a treatiſe called Flora, comprehending only the plants and trees to be found growing naturally in any place. However, in the more common acceptation of the word, floriſt ſignifies a perſon well ſkilled in flowers, their kinds and cultivation. See the article FLOWER.

FLORY, FLOWRY, or FLEURY, in heraldry,

raldry, a croſs that has the flowers at the end circumflex and turning down, differing from the potence, inaſmuch as the latter ſtretches out more like that which is called patee. See the articles POTENCE and PATEE.

The croſs-flory is repreſented in plate XCVIII. fig. 2.

FLOS, FLOWER, in botany. See the article FLOWER.

FLOS, in chemiſtry, the moſt ſubtile part of bodies ſeparated from the more groſs parts by ſublimation, in a dry form. 1. *Flores benzoini*, flowers of benjamin, are prepared in the following manner: put powdered benjamin into an earthen pot, placed in ſand, and with a ſmall heat the flowers will riſe, and may be caught by a paper-cone placed over the pot. See the article BENZOIN. 2. *Flores ſulphuris*, flowers of ſulphur: let ſulphur be ſublimed in a fit veſſel; and any part of the flowers which may have concreted are to be reduced to powder by a wooden mill, or in a marble mortar with a wooden peſtle. They are uſed in diſeaſes of the breaſt, and likewiſe in cutaneous diſtempers, both internally and externally. 3. *Flores ſulphuris loti*, flowers of ſulphur waſhed: pour water on the flowers, to the height of three or four fingers above them, and boil them for a time; then pour off this water, and with freſh cold water waſh the remains of this away; then dry the flowers for uſe. 4. *Flores martiales*, martial flowers: take of waſhed colcothar of green vitriol, or of iron-filings, one pound; of ſal ammoniac, two pounds: mix and ſublime them in a retort; and mixing again the bottom with the flowers, renew the ſublimation till the flowers acquire a beautiful yellow colour: to the reſidue may be added half a pound of freſh ſal ammoniac, and the ſublimation repeated; and the ſame proceſs may be continued, as long as the flowers riſe duly coloured. They are reckoned very attenuating and aperient, and therefore are preſcribed in many obſtructions, and in aſthmas. 5. *Flores biſmuthi*, flowers of biſmuth, are uſed as a fucus, being mixed with pomatum or roſe-water, *&c.*

FLOSCULOUS, among botaniſts, an appellation given to compound flowers, made up of a number of leſſer ones, all incloſed in the ſame common cup.

The plants with floſculous flowers make one of Tournefort's claſſes, called by Linnæus ſyngeneſia. See the articles BOTANY and SYNGENESIA.

FLOTA, or FLOTTA, FLEET, a name which the Spaniards give particularly to the ſhips that are annually ſent from Cadiz to the port of Vera Crux, to fetch thence the merchandizes gathered in Mexico for Spain. This fleet conſiſts of the captains, admiral, and patach or pinnance, which goes on the king's account; and about ſixteen ſhips, from four hundred to a thouſand tons, belonging to particular perſons. They ſet out from Cadiz about the month of Auguſt, and make it about eighteen or twenty months before they return.

FLOTILLA, a name given to a number of ſhips which get before the reſt in their return, and give information of the departure and cargo of the flota and galleons. See the preceding article.

FLOTSON, or FLOTSOM, goods that by ſhipwreck are loſt, and floating upon the ſea; which, with jetſon and lagan, are generally given to the lord admiral: but this is the caſe only where the owners of ſuch goods are not known. And here it is to be obſerved, that jetſon ſignifies any thing that is caſt out of a ſhip when in danger, and afterwards is beat on the ſhore by the water, notwithſtanding which the ſhip periſhes. Lagan is where heavy goods are thrown overboard, before the wreck of the ſhip, and ſink to the bottom of the ſea.

FLOUNDER, the engliſh name of a well-known fiſh, called by ichthyologiſts the pleuronectes with the eyes on the right ſide, the lateral or ſide lines rough, and ſmall ſpines at the fins. See the article PLEURONECTES.

The flounder is a well taſted fiſh, known in ſome parts of the kingdom by the names fluke and bul.

FLOUR, the meal of wheat-corn, finely ground and ſifted.

The grain itſelf is not only ſubject to be eaten by inſects in that ſtate, but when ground into flour it gives birth to another race of deſtroyers, who eat it unmercifully, and increaſe ſo faſt in it, that it is not long before they wholly deſtroy the ſubſtance. The fineſt flour is moſt liable to breed theſe, eſpecially when ſtale, or ill prepared. In this caſe, if it be examined in a good light, it will be perceived to be in a continual motion; and on a nicer inſpection, there will be found in it a great number of little animals, of the colour of the flour, and very nimble. If a little of this flour be laid on the plate of the double miſcroſcope, the inſects are very diſtinctly ſeen in great numbers, very briſk and lively, continually crawling over one another's backs, and playing a thouſand antick tricks together, whether for diverſion, or in ſearch of food, is not eaſily determined. Theſe animals are of an oblong and ſlender form; their heads are furniſhed with a kind of trunk, or hollow tube, by means of which they take in their food, and their body is compoſed of ſeveral rings. They do vaſt miſchief among the magazines of flour laid up for armies, and other public uſes: when they have once taken poſſeſſion of a parcel of this valuable commodity, it is impoſſible to drive them out; and they increaſe ſo faſt, that the only method of preventing the total loſs of the parcel, is to make it up into bread as ſoon as can be done. The way to prevent their breeding in the flour, is to preſerve it from damp: nothing gets more injury by being put up in damp, than flour; and yet nothing is more frequently put up ſo. It ſhould be always carefully and thoroughly dried, before it is put up; and the barrels alſo dried into which it is to be put; then, if they are kept in a room tolerably warm and dry, they will keep it well. Too dry a place never does flour any hurt, though one too moiſt always ſpoils it.

FLOUR, in geography, a city of the Lyonois, in France, forty-five miles ſouth of Clermont.

FLOWER, *flos*, among botaniſts and gardeners, the moſt beautiful part of trees and plants, containing the organs or parts of fructification. See the article FRUCTIFICATION.

The parts of a flower are the ovary or piſtil, the corolla or flower-petals, the ſtamina or chives, the empalement or calyx, the perianthium, pericarpium, and fruit. See the articles PISTIL, COROLLA, STAMINA, *&c.*

According to the number of petals, or flower-leaves, flowers are called monopetalous or one-leaved, dipetalous or two-leaved, tripetalous or three-leaved, *&c.*

Flowers are again diſtinguiſhed into male, female, and hermaphrodite: the male flowers are thoſe containing ſtamina, without any piſtil or fruit, commonly called ſtamineous flowers. The female flowers are ſuch as contain the piſtil, which is ſucceeded with fruit; theſe are called fruitful or knitting flowers. The hermaphrodites are thoſe which contain the organs of both ſexes, *viz.* ſtamina and piſtils; and theſe are by far the moſt numerous.

From the different figures and diſpoſition of the flower-leaves of plants, Mr. Tournefort has eſtabliſhed a ſyſtem of botany; whereas that of Linnæus is chiefly founded on the number and diſpoſition of the ſtamina. See BOTANY.

Flowers were in great requeſt among the antients: they adorned their temples, houſes, and even tombs with them; but their principal uſe ſeems to have been at entertainments, where the gueſts were always decked with flowers, and even the room ſtrewed with them.

Quincy tells us, that flowers, deſigned for medicinal uſe, ſhould be plucked when they are moderately blown, and on a clear day before noon: and that for conſerves, roſes muſt be taken in the bud.

For the method of preſerving ſpecimens of flowers, ſee HORTUS SICCUS.

FLOWER *of Briſtol*, a plant more uſually called lychnis. See LYCHNIS.

Gentle **FLOWER**, the ſame with amaranth. See the article AMARANTH.

Eternal **FLOWER**, the engliſh name of the xeranthemum. See XERANTHEMUM.

Everlaſting **FLOWER**, the engliſh name of the gnaphalium. See GNAPHALIUM.

FLOWER-FENCE, the engliſh name of the poinciana. See POINCIANA.

FLOWER DE LUCE, the ſame with the iris. See the article IRIS.

Sultan **FLOWER**, the ſame with the cyanus. See the article CYANUS.

Sun-**FLOWER**, the engliſh name of the helianthus. See HELIANTHUS.

Trumpet-**FLOWER**, the ſame with the bignonia. See the article BIGNONIA.

Wind-**FLOWER**, the ſame with the anemone. See the article ANEMONE.

FLOWERS, in chemiſtry. See the article FLOS, *ſupra.*

FLOWER DE LIS, or **FLOWER DE LUCE**, in heraldry, a bearing repreſenting the lilly, called the queen of flowers, and the true hieroglyphic of royal majeſty; but of late it is become more common, being borne in ſome coats one, in others three, in others five, and in ſome ſemee, or ſpread all over the eſcutcheon in great numbers.

The arms of France are, three flower de lis or, in a field azure.

FLOWN-SHEETS, in the ſea-language. A ſhip is ſaid to ſail with flown-ſheets, when her ſails are not haled home, or cloſe to the blocks. *The ſheets are flown,* that is, they are let looſe, or run as far as they will.

FLOX, among dyers, ſignifies well cleaned wool, uſed to abſorb the colours of cochineal.

FLUDDER, or **FLUDER**, a large bird of the colymbus or diver-kind, nearly allied to the lumme. See COLYMBUS and LUMME.

FLUELLIN, the engliſh name of a plant called by botaniſts elatine. See the article ELATINE.

FLUENT, in fluxions, the flowing quantity, or that which is continually either increaſing, or decreaſing, whether line, ſurface, ſolid, &c. See FLUXION.

It is eaſy to find the fluxions, where the fluents are given; but, on the contrary, it is very difficult to find the fluents of given fluxions.

FLUID, in phyſiology, an appellation given to all bodies whoſe particles eaſily yield to the leaſt partial preſſure, or force impreſſed.

Some philoſophers make the following diſtinction in fluids; thoſe which flow or ſpread themſelves till their ſurfaces become level or horizontal, they call liquid, in contradiſtinction to flame, ſmoke, vapour, &c. which are alſo fluids, but do not acquire ſuch a ſurface. Thoſe which are capable of exciting in us the idea of moiſtneſs, as water, &c. they call humid, diſtinguiſhing them thereby from air, quickſilver, and melted metals. But theſe diſtinctions are quite unneceſſary in a philoſophical ſenſe; the ſurfaces of all fluids being level, or horizontal, when not prevented by the bodies about them: and humidity is only a relative quality; for though quickſilver will not moiſten or ſtick to a man's finger, it will to ſilver or gold. See the article FLAME, SMOKE, LIQUID, &c.

The nature of a fluid, as diſtinguiſhed from that of a ſolid, or hard body, conſiſts in this, that its particles are ſo looſely connected together, that they readily move out of their places, when preſſed with the leaſt force one way more than another. From whence philoſophers conclude, that theſe particles are exceedingly minute, ſmooth, and round, it being otherwiſe impoſſible they ſhould move with ſuch freedom upon the leaſt inequality of preſſure:

Thoſe particles conſidered ſeparately, are endowed with all the common properties of matter, and are ſubject to the ſame laws of motion and gravitation with lager bodies. To enquire, therefore, into the nature of fluids, is to conſider what appearances a collection of very ſmall round bodies, ſubject to theſe laws, will exhibit under different circumſtances.

Laws and properties of FLUIDS. 1. All fluids are incompreſſible, except air; or, they cannot, by any force, be compreſſed into a leſs ſpace than what they naturally poſſeſs, as is proved by the florentine experiment, of filling a globe of gold with water, which, when preſſed with great force, cauſes the water to tranſude or iſſue through the pores of the gold, in form of a dew all over its ſurface. See the article AIR.

2. All fluids gravitate, or weigh in proportion to their quantity of matter, and that not only in the air, but *in proprio loco*: or, a fluid weighs the ſame, communicating with a quantity of that fluid, as *in vacuo*; which all philoſophers, till very lately, have denied.

The reaſon was this, becauſe philoſophers found that a bucket of water, in water, weighed nothing; that is, that becauſe there was no relative gravity in water, they very ſtrangely inferred there was no abſolute gravity in any part or particle of water, whilſt it remained in water, but only became heavy when taken out or ſeparated from the reſt. But their miſtake is eaſily evinced by the following experiment: let a bottle, or phial, with ſhot in it, to make it ſink in water, when cloſe ſtopped, be hung at the end of a nice balance, and then immerſed into a jar of water: while thus hanging in water, let it be counterpoiſed very exactly by weights put into the ſcale at the other end; then, pulling out the cork, the water will ruſh into the bottle, and deſtroy the equilibrium, by cauſing the balance to deſcend; which will be a plain proof that water has weight in water.

That fluids gravitate, or are heavy, in the ſame manner with ſolids, is evident; becauſe the earth's attraction, which is the cauſe of gravity, equally affects the particles of all ſorts of matter, and therefore excites the ſame endeavour, or tendency towards the center of the earth, in the particles of a fluid, as in thoſe of a ſolid body: and this is what we call abſolute gravity. See the article GRAVITY. Now ſince in fluids of the ſame kind as water, all the particles are reaſonably ſuppoſed equal and alike in all circumſtances,

FLUIDS.

Fig. 1.

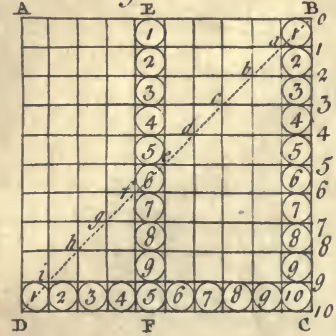


Fig. 2.

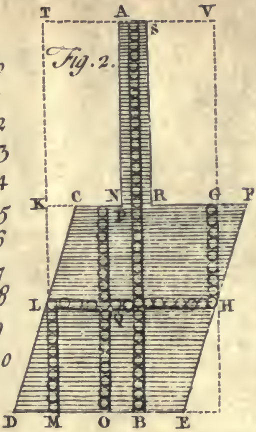


Fig. 3.

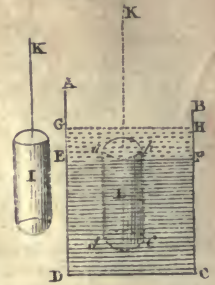


Fig. 4.

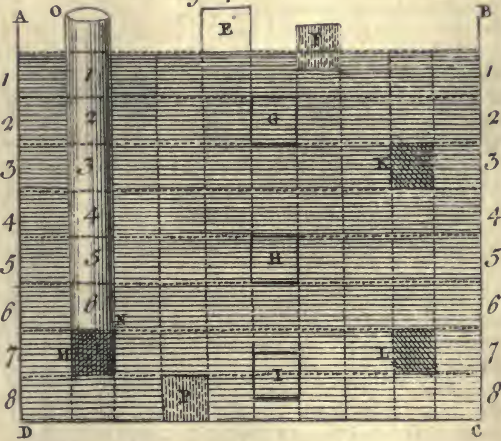


Fig. 5.

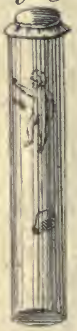


Fig. 6.

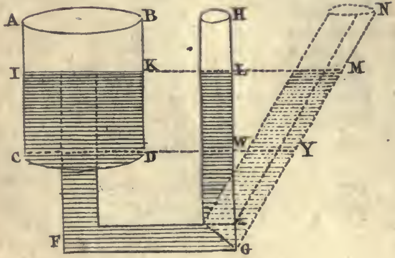
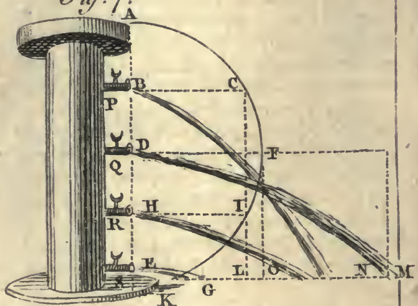


Fig. 7.



T. Jefferys sculp

ſtances, they will be all equally affected by attraction, and therefore have, among themſelves, an equal tendency towards the earth's center; whence, ſince they gravitate equally, if they are equally obſtructed in their deſcent (as by the bottoms of the veſſels, *&c.*) they will all retain the ſame poſition among themſelves, as if they were affected by no power at all; and thus they are ſaid to be relatively at reſt, or in a ſtate of quietus among themſelves; ſince no one particle of the ſame fluid has a greater ſhare of attracting power than another, no one will tend to deſcend before another; and therefore, among the particles of the ſame fluid, there is no ſuch thing as what we call relative or reſidual gravity, which is nothing but the exceſs of gravity, by which one body tends downwards more than another.

3. From the gravity of fluids ariſe their preſſure, which is always proportional thereto: and ſince we may ſuppoſe all the particles of a fluid to have equal bulk and weight, the gravity of the fluid, and conſequently the preſſure will be always proportional to the altitude or depth thereof: whence the weight and preſſure of fluids on the bottoms of veſſels, *&c.* muſt be equal.

4. The preſſure of fluids upwards is equal to the preſſure downwards, at any given depth. To illuſtrate this and the foregoing propoſition, let A B C D (pl. C. fig. 1.) be a veſſel of water, whoſe altitude E F ſuppoſe to conſiſt of a column of 10 aqueous particles; then, it is evident, the firſt or uppermoſt particle 1 can affect the next particle 2, only by its weight or preſſure, which therefore is as 1; and ſince that particle 2 is immoveable, and action and re action equal and contrary, the ſaid particle 2 will re-act upwards upon the particle 1, with a force which is as 1. In the ſame manner the particle 2 acts on the particle 3, by preſſure downwards, with two degrees of force, ariſing from its own weight and from that of the particle above it; and accordingly it is preſſed upwards with an equal force by the re-action of the particle 3. And ſo of all the reſt, wherefore the propoſitions are manifeſt.

5. The preſſure is upon all particles of the fluid, at the ſame depth, equal in every part; or the particles of a fluid, at the ſame depth, preſs each other, every way and in all directions, equally. For if any particle were preſſed more on one part than another, it muſt give way and yield, till the preſſure become every way equal; otherwiſe an inceſſant inteſtine motion of the particles muſt enſue, which is abſurd, and contrary to experience.

6. From the mutual preſſure and equal action of the particles, it follows, that the ſurface of a fluid muſt be perfectly ſmooth and even; for ſhould any part ſtand higher than the reſt, by any force, as attraction, *&c.* it would immediately ſubſide to a level with the other part, by the force of its own gravity, when that force is removed.

7. The figure of the ſurface of all fluids is ſpherical or convex; for all the particles equally gravitating towards the center of the earth, will take their places from it at equal diſtances at the ſurface, and ſo form a part of the ſuperficies of a ſphere, equal to the bulk of the earth.

Beſides the reaſon of the thing, we know from experiment, that the ſurface of large waters, as thoſe of the ſea or ocean, is convex; for a perſon ſtanding on the ſhore, and viewing a ſhip under ſail, directly before him, will loſe ſight thereof by degrees, the hull or body of the ſhip firſt diſappearing, then the lower parts of the maſt, then the top of the lower maſts, and, laſtly, the top of the talleſt maſt. This is more fully explained in determining the figure of the earth. See the article EARTH.

8. Since fluids preſs equally every way, the preſſure of each particle againſt the ſide of a veſſel will be proportional to its altitude, and conſequently the preſſures of the particles 1, 2, 3, 4, *&c.* of a perpendicular column againſt the ſide BC (*ib.* fig. 1.) will be a ſeries of numbers in arithmetical progreſſion, whoſe firſt term is 0; therefore the ſum of all the preſſures is equal to the number of preſſures multiplied by half the greateſt preſſure: but the number of preſſures is as the number of particles, or altitude of the fluid BC; alſo the greateſt preſſure is as the ſame altitude; wherefore the total preſſure againſt the ſide of a veſſel, is as the ſquare of the altitude of the fluid. See the article PROGRESSION.

This way of conſidering the quantity of lateral preſſure, by the arithmetical ſeries, is univerſal; whereas the common method reſtrains it to the property of an equicrural right-angled triangle, and to a veſſel of a cubical form, which we ſhall here give, for the ſake of proving it ſeveral ways: ſuppoſe A B C D (*ib.* fig. 1.) a veſſel of a cubical form, that is, whoſe ſide B C is equal to the length of the bottom C D. If the diagonal B D be drawn, we ſhall have the lines $1a = B1$, $2b = B2$, $3c = B3$, $4d = B4$, &c. But B 1, B 2, B 3, B 4, &c. being as the altitudes of the fluid, will repreſent the lateral preſſures in the points 1, 2, 3, 4, &c. therefore alſo the lines *a* 1, *b* 2, *c* 3, *d* 4, &c. will repreſent the ſame lateral preſſures; hence when the diſtances B 1, 12, 23, &c. are indefinitely ſmall, the lines *a* 1, *b* 2, *c* 3, *d* 4, &c. will be infinitely near each other; and ſo all thoſe lines drawn in the triangle B C D, will make the area of that triangle: therefore the ſum of all the lateral preſſure againſt the ſide B C, will be as the area of that triangle. But the area of the triangle B C D is as the ſquare of the ſide B C; conſequently the ſum of all the lateral preſſures is as the ſquare of the altitude of the fluid B C.

9. Hence, if the veſſel A C (*ib.* fig. 1.) be of a cubical form, the preſſure againſt a ſide B C, is half that upon the bottom C D, and conſequently the total preſſure againſt the ſides and bottom is equal to three times the weight of the fluid on the bottom of ſuch a veſſel.

10. The weight, preſſure, or effect of a fluid, upon the bottom D E (*ib.* fig. 2.) of any veſſel A C D E F, is proportional to the altitude A E only, and not to the quantity of the fluid in the veſſel. For every column of particles G H, which preſſes downwards on the ſide of the veſſel E F, has its force deſtroyed by the equal re action of the ſubjacent particle H in the ſide, and ſo cannot at all affect the bottom of the veſſel. Again, the preſſure of any column of particles L M upwards, againſt the ſide of any veſſel C D, is equally re-acted by the particle of the veſſel over it, and ſo its force or preſſure on the bottom muſt be the ſame as that of another column of particles A B of equal altitude with the fluid: whence the propoſition is evident.

11. Hence a very ſmall quantity of fluid A P R S (*ib.* 2.) may be made to counterballance, or be equivalent to the weight or force of any given quantity T K G V, how great ſoever.

12. When any body is immerſed in a fluid, it loſes juſt ſo much of its weight as is equal to the weight of an equal bulk of the fluid; but the weight loſt by the body is gained by the fluid, which will be ſo much heavier than before.

This is the fundamental principle of every hydroſtatic proceſs, particularly of the whole doctrine of ſpecific gravities, which therefore cannot be made too plain and eaſy to be underſtood.

To this end, let A B C D, (fig. 3.) be a veſſel filled with water, to the height E F; and let I be a cylindric body, heavier than water, to be immerſed therein, as at L. By this immerſion of the body I, a quantity of the fluid *a b c d*, equal in bulk to the body, will be diſplaced by the ſuperior force, or greater gravity of the ſolid; and this quantity of fluid muſt aſcend, as being confined towards the bottom and ſides; and ſo riſe the ſurface of the liquor from E F to G H, and then will the quantity E F G H be equal to the bulk of the immerſed ſolid *a b c d*. But as the ſolid comes to enter the fluid, each particle of the fluid, by its vis inertiæ, will reſiſt the ſolid, or endeavour to oppoſe its deſcent with all its power; and ſo the whole body of the fluid, that is removed or diſplaced by the ſolid, will reſiſt by the united force of all the particles: but this force is equal to the gravity of the fluid removed, as is evident from hence, that the fluid ſo removed is obliged to aſcend or move in a direction quite contrary to gravity, wherefore the ſolid in its deſcent will be reſiſted by a force equal to the gravity of an equal bulk of the fluid.

And ſince the force which reſiſts the deſcent of ſolids is proportioned to their bulk only, it follows, that equal bodies immerſed in fluids, loſe equal parts of their weights; and therefore, a lighter body loſes more of its abſolute weight than a heavier one of the ſame bulk; and conſequently if two bodies of unequal bulk are in equilibrio in the air, that equilibrium will be deſtroyed on their being immerſed in the fluid, becauſe that which has the largeſt bulk will loſe moſt weight in the fluid.

Again, it is plain, the weight of the fluid is augmented in the ſame proportion as that of the immerſed ſolid is diminiſhed; for the force or action of the fluid, on the bottom of the veſſel C D, is before immerſion to that afterwards, as the altudes C F to C H; or to the bulks of the fluid E F C D and G H C D. And ſince thoſe bulks act only by their gravity, 'tis plain the action of the fluid is encreaſed only by the additional gravity of the quantity G H F E, which is equal to that which the ſolid loſes by immerſion. See the article GRAVITY.

13. If any body E (fig. 4.) could be found without weight, it would, if placed on the ſurface of a fluid A B, float thereon, without any part immerſed; for being devoid of gravity, it could have no force to diſplace any particles of the fluid, and ſink therein.

14. If an heavy body F, (n° 4.) lighter than an equal bulk of the fluid, be placed on its ſurface, it will ſink, or deſcend therein till it has removed or diſplaced ſo much of the fluid whoſe weight is equal to that of the body. For then the preſſure upwards and downwards on the ſurface of the body is equal, and conſequently the body will be there quieſcent, or in equilibrio with the fluid. Hence the whole ſolid is to the immerſed part as the ſpecific gravity of the fluid is to that of the ſolid. See the article HYDROSTATIC BALLANCE.

This caſe is not ſtrictly true, but in vacuo; for in the air ſuch a body may be conſidered as ſuſtained by two mediums, *viz.* air and water, in one of which it will ſink, or deſcend; and in the other, riſe.

15. If a ſolid, as G, (n° 4.) equal in weight to an equal bulk of the fluid, be immerſed therein, it will take any ſituation indifferently in any part of the fluid, as at G, H, I, without any tendency to aſcend or deſcend therein; for being totally immerſed, it muſt remove a parcel of the fluid of equal bulk and weight, and conſequently the preſſure upwards is equal to the tendency downwards, on the lower ſurface, every where; and therefore it can have no power to ſink. Alſo the preſſure downwards muſt be equal to the preſſure upwards, on the upper ſurface, whence it can have no tendency to riſe or ſwim: it will therefore remain at reſt in any poſition G, H, I, whereſoever in the fluid.

16. Laſtly, if a body K, or L, (fig. 4.) heavier than an equal bulk of the fluid, be immerſed therein, it will deſcend by the exceſs of its gravity above that of the fluid; for when immerſed, it will be reſiſted by the force of an equal bulk of the fluid, which therefore will deſtroy ſo much of the gravity of the ſolid; and conſequently the reſidue, or exceſs of gravity in the ſolid, is that alone by which it muſt deſcend.

This relative gravity of ſolids, by which they ſink or ſwim, is uſually illuſtrated by the deſcent and aſcent of glaſs images, and bubbles included in a jar of water, covered over with a bladder, ſo as to include a ſmall quantity of air between the bladder and water; the images, &c. have ſmall holes in the bottom of their feet thro' which ſome water is put into their bodies, and that in ſuch quantities as will render them but very little ſpecifically lighter than water; but ſome more ſo than others, that they may not begin to move all together. See the repreſentation in fig. 5. The images being thus put to float in water, and the bladder tied down, if the hand be laid on the bladder, and gently compreſſes the air beneath, the air, by its ſpring, will act upon the water, and cauſe it to compreſs the air in the bodies of the images, by which means more water will be driven into their bodies; and when ſo much is got in as will make them ſpecifically heavier than the water, then they will begin to deſcend one after another; and by varying the degree of preſſure, you may keep them ſuſpended in any part of the fluid as you pleaſe.

From what has been premiſed of the nature of fluids, it will be eaſy to underſtand, that the lighteſt body, P, (plate *ibid.* fig. 4.) may be depreſſed in the heavieſt fluid by any contrivance to keep the ſaid fluid from preſſing on the under ſurface of the light body, by which means only light bodies are made to ſwim. Thus cork, or wood, will abide at the bottom of a veſſel filled with quickſilver.

Again: on the other hand, the heavieſt body M may be made to ſwim in the lighteſt fluid, by keeping the ſaid fluid from preſſing on its upper ſurface, by means of the tube N O. For when by this means it is immerſed ſo deep as to keep off an equal weight of the fluid, the preſſure then of the fluid acting upon its under ſurface upwards, will be equal to the weight of the ſolid tending downwards; and therefore, if the ſolid be ſunk ever ſo little deeper, it muſt ſwim by the ſuperior force or preſſure of the fluid upwards.

Thus, for inſtance, if the body M be five times heavier than water of an equal bulk, and if by means of the tube N O, placed on its upper ſurface, the water be kept from preſſing thereon, that it be immerſed to ſeven times its thickneſs below

low the ſurface of the water, 'tis plain the preſſure on the under ſurface will be as ſeven, but downwards only as five; and therefore, ſince there is the exceſs of two degrees of preſſure upwards, 'tis plain the body cannot deſcend; but may very properly be ſaid to ſwim on the water. Hence alſo the reaſon of trying the different gravity, denſity, or ſtrength of divers fluids, or ſpirituous liquors, by the hydrometer, or water-poiſe. See the article HYDROMETER.

Motion of FLUIDS. The motion of fluids, *viz.* their deſcent or riſe below or above the common ſurface or level of the ſource or fountain, is cauſed either, 1. by the natural gravity or preſſure of the fluid contained in the reſervoir, or fountain; or, 2. by the preſſure or weight of the air on the ſurface of the fluid in the reſervoir, when it is at the ſame time either taken off or diminiſhed on ſome part in aqueducts, or pipes of conduit. 3. By the ſpring, or elaſtic power of compreſſed or condenſed air, as in the common water engine. 4. By the force of piſtons, as in all kinds of forcing pumps, &c. 5. By the power of attraction, as in the caſe of tides, &c.

1. The moſt natural motion of fluids is that ariſing from the force of their own gravity, by which thoſe parts which ſtand higheſt preſs upon others below them, till by that means they riſe to the ſame horizontal level. Thus water in a fountain ABCD (fig. 6.) by its preſſure, raiſes that in the aqueduct FGH to the ſame height IKLM in every direction or poſition of the duct GH, or GN; unleſs the orifice of the ſaid duct be below that level, in which caſe the water will continually flow from the ſame. The reaſon hereof is evident from the principles already laid down, *viz.* that the preſſure of fluids was in proportion to the altitude only, and not according to the quantity thereof, and therefore the effect or riſe of the fluid in the duct muſt be equal thereto.

Hence we have conduits often ſupplied with water from ſprings, which lie above them; and cocks to ſupply the inhabitants of a town with water by pipes from a reſervoir, in a ſituation above the higheſt part of the town: hence alſo the deſcent of water in rivers, ſtreams, and canals from ſprings and ſources above the common ſurface of the earth; and the breaking out of ſprings at the bottoms and on the ſide of hills; from ciſterns and reſervoirs in the internal parts above them, which receive their water from rain, dew, condenſed vapour, melted ſnow, &c. diſtilling, or percolated through the pores or crevices and chaſms of the upper part of the earth. See the articles FOUNTAIN, SIPHON, CONDUIT, TANTALUS'S CUP, JET D'EAU, RESERVOIR, CANAL, SPRING, CISTERN, &c.

2. The ſecond cauſe of the riſe or motion of fluids is the preſſure of the air on the ſurface of that in the fountain or reſervoir: thus if a ſyphon or crane be immerſed with the ſhorter leg in water, and the air ſucked out of the inſtrument, the fluid will aſcend into the vacuous ſpace by the preſſure of the air on the water, and fill the whole cavity of the tube; and becauſe there is a greater column of water in the longeſt leg, it will preponderate and deſcend thro' it, and will keep flowing out till the veſſel is exhauſted to the orifice of the ſhorter leg. The effect of the common pump is from the ſame principle. See the article PUMP.

3. The third cauſe of the riſe and motion of fluids is by the ſpring or elaſtic power of condenſed air, upon which principle water engines are contrived. See the article ENGINE.

4. The fourth cauſe is the force or preſſure of piſtons, upon which principle a variety of water engines are conſtructed, as may be ſeen under the articles already referred to.

5. The laſt cauſe of the motion of fluids which we mentioned was that of attraction. We have elſewhere ſhewn how by this means any fluid will aſcend above the common ſurface in capillary tubes, &c. See the article CAPILLARY.

But the moſt notable and obvious motion of fluids ariſing from attraction, is that of the tides; the waters of the immenſe ocean, forgetful, as it were, of their natural quietus, move and roll in ſwelling tides obſequious to the ſovereign power of the moon, and weaker influence of the ſun. See the article TIDES.

Momenta and velocities of FLUIDS. The momenta of fluids, as well as of ſolids, are compounded of the quantity of matter and velocity; but in ſpouting fluids, the quantity of the fluid iſſuing thro' the ſame hole, in the ſame time, is always as the celerity of its motion, as is eaſy to conceive. Whence the momenta of ſpouting fluids are proportional to the ſquares of the velocities,

cities, or quantities of matter iſſuing out in a given time. But ſince the momenta are the effect of preſſure, it is evident the velocity or quantity of ſpouting fluids is ever proportional to the ſquare root of the preſſure, or altitude of the fluid. From hence it appears, that the velocity of a fluid ſpouting at any depth below the ſurface is equal to the velocity a heavy body would acquire by falling from the ſame height; becauſe the velocity, as was obſerved, is always as the ſquare root of the ſpace deſcended through. If therefore on the altitude of the fluid A K, (fig. 7.) as a diameter, we deſcribe the ſemicircle A F K, and from any point therein, as I, we draw the perpendicular I H, that ſhall be proportional to the diſtance to which the fluid will ſpout from an adjutage at H: for the velocity will be, as the ſquare root of A H; and the time, as the ſquare root of H K; whence the product of theſe two will expreſs both the ſpace paſſed over by the projected body, and alſo the line H I.

Hence it follows, that a fluid will ſpout from a hole or adjutage D, in the center of the ſemicircle, or middle part of the altitude A K, to the greateſt horizontal diſtance K M poſſible; becauſe the perpendicular F D is the greateſt that can be drawn to the diameter A K. Alſo it is evident, that from two holes B and H, equally diſtant above and below the middle altitude D, the jets of water will be made to the ſame horizontal diſtance K N; becauſe the perpendiculars to theſe two points, *viz.* C B and I H, are equal. Moreover, the horizontal diſtance K M, to which the water ſpouts from D the center, is equal to the diameter or altitude A K, or twice D F. For ſince the velocity of the jet at Q is equal to that acquired by falling through the height A D, or D K, it will, as being uniform, carry the fluid in an horizontal direction over twice the ſpace D K or D F in the ſame time. And therefore, ſince the diſtances of jets from D and B are as D F to B C, and the diſtance of the jet from D is equal to twice D F, the diſtance of the jet from B will be alſo equal to twice B C, or K N = 2 B C.

From what has been ſaid, it is eaſy to obſerve, that the motion of a ſpouting fluid is every way ſimilar to that of a projected ſolid. The path of the fluid is a parabola, becauſe it is impelled by two forces, one horizontal, the other of gravity in the perpendicular, in the ſame manner as in the projected ſolid. See the article PROJECTILE.

The impetus of the jets B, D, H, E, is as the height of the reſervoir A B, A D, A H, A E; the greateſt horizontal random K M, is that from the jet D, directed to the middle point F of the ſemi-circle; and any two jets equally diſtant as B, H, go to the ſame diſtance K N on the horizon. If the adjutage be horizontal, the jet will be a ſemi-parabola; if oblique, it will be a whole parabola. See the article PARABOLA.

FLUKE, in ichthyology. See FLOUNDER.

FLUKE *of an anchor*. See ANCHOR.

FLUMMERY, a wholeſome ſort of jelly made of oat-meal.

The manner of preparing it is as follows. Put three large handfuls of finely ground oat-meal to ſteep, for twenty-four hours, in two quarts of fair water: then pour off the clear water, and put two quarts of freſh water to it: ſtrain it through a fine hair ſieve, putting in two ſpoonfuls of orange flower-water, and a ſpoonful of ſugar: boil it till it is as thick as a haſty pudding, ſtirring it continually while it is boiling, that it may be very ſmooth.

FLUOR, in phyſics, a fluid, or more properly, the ſtate of a body that was before hard or ſolid, but is now reduced by fuſion, or fire, into a ſtate of fluidity.

FLUOR, in mineralogy, implies a ſort of mineral concretion, frequently found amongſt ores and ſtones, in mines and quarries.

FLUOR ALBUS, or WHITES, in medicine, an efflux of a whitiſh, lymphatic, ſerous, or aqueous humour, from the matrix. It is ſometimes white, ſometimes pale, yellow, green, or blackiſh. Sometimes it is ſharp and corroſive, ſometimes foul and fetid; the face is diſcoloured, there is a pain in the ſpine of the back, the appetite is loſt, and the eyes and feet ſwell. Some women have a periodical flux of the whites, inſtead of the menſes. There are remarkable diſtinctions in this diſorder, as the lacteous, the ſemi-lacteous, and lymphatic: it may be ſo acrid or cauſtic, as to excoriate the vulva. Beſides the ſymptoms already mentioned, it is attended with a ſwelling of the uterus; turbid urine; a loathing of ſome things, and longing for others; a ſlow fever; dropſies of different parts, of which, or a conſumption, the patient dies. It may be confounded with an ulcer of the uterus, or a gonorrhœa muliebris. See the article GONORRHOEA.

The fluor albus ſometimes is diſcharged

from the uterine veſſels, and ſometimes from the glands of the vagina. In the firſt caſe it ſtops when the menſes begin to flow; in the latter it continues with them; and pregnant women are not exempted from it. At firſt the parts of the membranæ adipoſæ of the loins, kidneys, and the uterine appendages, are waſted by it: but at length the flux becomes acrimonious. When the flux is lacteous, it may be cured in fifteen days; the patient muſt feed ſparingly, uſe frequent exerciſe, and ſleep little. If this is not complied with, ſhe muſt bleed in the arm, once or twice a month, and take purges and emetics; or, at leaſt, frequent clyſters. The efficacy of all theſe muſt be aſſiſted with diaphoretics, decoctions of the woods, and diuretics. In the ſemilacteous flux, an inſpiſſating and nouriſhing diet will be beſt, ſuch as creams, ſoups, boiled milk, roaſt meat, jellies, *&c.* Milk, or milk turned with a decoction of china, is very good. Narcotics are highly uſeful, eſpecially if the patient is reſtleſs, or delirious. In the beginning, the doſe muſt be ſmall, but it may be gradually encreaſed. When the veſiculæ lacteæ are relaxed, the tone muſt be reſtored with hot mineral baths, and fomentations; and injections of, and bathing in the ſame: the fumes may alſo be conveyed into the vagina with a funnel. Decoctions of the woods are alſo good; as are diaphoretics, and diuretics of a decoction of roots of eryngo and reſt-harrow, with powder of millepedes, or glauber's ſalt.

If the lymphatic flux is attended with a ſcrophulous, ſcorbutic, or venereal taint, theſe diſorders muſt firſt be removed. If the uterine lymphatics are compreſſed by ſchirroſities, cancers, ganglions, or the like, regard muſt be had to the cauſes.

In obſtructions of the glands of the uterus, begin with bleeding: then a gentle purge, or an emetic of iij gr. of tartar-emetic, or ipecacuanha: afterwards, if the patient's conſtitution is cold, attenuating aperients. If ſhe is hot and bilous, with a ſenſible pain in the uterus, cooling broths and apozems, with the addition of cray-fiſh; aſſes milk, with a decoction of barley; chalybeate whey, with chervil boiled therein; gently purging mineral waters; baths and half baths are convenient in the ſummer.

FLUSH-DECK, in a ſhip. See DECK.

FLUSHER, in ornithology, a bird otherwiſe called the lanius minor, or leſſer butcher-bird. See the article LANIUS.

FLUSHING, or VLISSENGEN, a port town of Zealand, in Holland, five miles ſouth of Middleburg: eaſt long. 3° 25′, north lat. 51° 30′.

It is a town of great foreign trade, and has a good ſecure harbour.

FLUTE, *fiſtula*, an inſtrument of muſic, the ſimpleſt of all thoſe of the wind kind. It is played on by blowing it with the mouth, and the tones or notes are changed by ſtopping and opening the holes diſpoſed for that purpoſe along its ſide. The antient fiſtulæ, or flutes, were made of reeds, afterwards of wood, and laſt of metal: but how they were blown, whether as our flutes, or as hautboys, does not appear.

'Tis plain ſome had holes, which, at firſt, were but few, but afterwards increaſed to a great number, and ſome had none; ſome had ſingle pipes, and ſome a combination of many, particularly Pan's ſyringa, which conſiſted of ſeven reeds joined together ſideways.

German FLUTE, is an inſtrument intirely different from the common flute. It is not, like that, put into the mouth to be played, but the end is ſtopt with a tampion, or plug; and the lower lip is applied to a hole about two inches and a half, or three inches, diſtant from the end. This inſtrument is uſually about a foot and a half long; rather bigger at the upper end than the lower; and perforated with holes, beſides that for the mouth, the loweſt of which is ſtopt and opened by the little finger's preſſing on a braſs, or ſometimes, a ſilver key, like thoſe in hautboys, baſſoons, *&c.* Its ſound is exceeding ſweet and agreeable; and ſerves as a treble in a concert.

Coarſe flutes, on importation, pay the gros, containing twelve dozen, 3 s. $10\frac{20}{100}$ d. and on exportation draw back 3 s. $4\frac{50}{100}$ d.

FLUTE, or FLUYT, is alſo a kind of long veſſel, with flat ribs, or floor timbers; round behind, and ſwelled in the middle; ſerving chiefly for the carrying of proviſions in fleets, or ſquadrons of ſhips, though it is alſo uſed for merchandize.

FLUTES, or FLUTINGS, in architecture, perpendicular channels, or cavities, cut along the ſhaft of a column, or pilaſter. They are chiefly affected in the ionic order, where they had their firſt riſe;

though, indeed, they are uſed all in the richer orders, as the corinthian and compoſite; but ſeldom in the doric, and ſcarce ever in the tuſcan.

Each column has twenty-four flutes, and each flute is hollowed in exactly a quadrant of a circle: but the doric has but twenty. Between the flutes are little ſpaces that ſeparate them, which Vitruvius calls *ſtria*, and we liſts: though, in the doric, the flutes are frequently made to join to one another, without any intermediate ſpace at all; the liſt being ſharpened off to a thin edge, which forms a part of each flute. See LIST.

Vignola determines the depth of the flutes by taking the angle of the equilateral triangle for the center. Vitruvius deſcribes the depth from the middle of the ſquare, whoſe ſide is the breadth of the flute, which latter method makes them deep. Some columns have flutes that go winding round the ſhaft, ſpirally; but this is rather accounted an abuſe. The flutes, or ſtriæ, are commonly filled up with a prominent or ſwelling ornament; ſometimes plain, in form of a ſtaff or reed; and ſometimes a little curved, or enriched, in imitation of a rope, or otherwiſe. See the article CABLED.

Sometimes the flutings are made flat, and are called facettes: but theſe have never ſuch a good effect as the others. Vitruvius ſays, that when there are flutings in the column, there ought alſo to be eggs and anchors in the quarter round of the capital, and even pearls and olives, in a baguette, to be made underneath, inſtead of annulets. Theſe eggs and olives ought to be in the ſame number with the flutings, and to be regularly diſtributed.

FLUX, in medicine, an extraordinary iſſue, or evacuation of ſome humours of the body.

Sometimes it is taken for all kinds of defluxions; in which ſenſe it is the ſame with a catarrh, or coryza. See the article CATARRH.

Sometimes it ſignifies a looſeneſs, or flux, of the belly, which is of four kinds. When the food is diſcharged by ſtool undigeſted, it is called a lientery, or lienteric flux. When the chyle is diſcharged, it is called cœliaca. When excrementitious humours are diſcharged, as choler, phlegm, *&c.* it is called ſimply a diarrhœa; and when the ſtools are bloody, it is called a dyſentery, or bloody-flux. See the articles LIENTERY, COELIAC PASSION, DIARRHOEA, and DYSENTERY.

Again, there is an hepatic flux: but this is ſuppoſed to be no other than the hæmorrhoidal flux. See the article HÆMORRHOIDS.

FLUX of the urine. See the article DIABETES.

Women are ſubject to three ſeveral kinds of fluxes extraordinary; the firſt, called the menſes, or menſtrual flux; the ſecond is after delivery, and is called lochia: theſe are regular and natural. See the articles MENSES and LOCHIA.

The third, being irregular and preternatural, is termed the fluor-albus, or whites. See FLUOR ALBUS.

FLUX, in hydrography. See TIDE.

FLUX, in metallurgy, whatever can cauſe a body otherwiſe not at all, or hardly, fuſible by fire, to melt.

Fluxes, ſays Dr. Shaw, ſeem reducible to two general kinds, *viz.* the vitreous and the ſaline. By the vitreous we underſtand all thoſe which either have of themſelves, or readily aſſume, a glaſſy form in the fire; among the principal whereof are reckoned the glaſs of lead, the glaſs of antimony and borax. By the ſaline kind of fluxes are underſtood all thoſe that are compoſed of ſalts, whether tartar, nitre, fixed alkali, or the like. Among the principal of this kind we reckon the black flux, ſandiver, kelp, *&c.* See the articles SANDIVER and KELP.

The method of making the black flux is as follows. Take one part nitre, and two parts common tartar, and reducing each to powder, mix them together: deflagrate the whole in a crucible, by lighting the mixture a-top, which thus turns to a kind of alkaline coal, that is to be pulverized and kept cloſe in a glaſs, to prevent its diſſolving, as it would do in a moiſt air.

The vitreous kind of fluxes ſeem more immediately deſtined to act upon the ſtony or vitreſcible matter, wherewith ſtubborn ores are frequently mixed, and the ſaline kind to act more immediately upon the ore itſelf, for the due excluſion or ſeparation of the metal. The more kindly ores require no flux to make them run thin, or to afford all the metal they contain, and ſometimes ores are ſo kindly as to contain their own fluxes within themſelves. Thus, we have met with copper-ores, which being barely ground to powder, and melted without any addition in a common wind-furface, have yielded as much, or even more, pure metal at the firſt operation, than could be obtained from them by means of the uſual fluxes. Whence we ſee that artificial fluxes are not always neceſſary; or that the principal uſe of them is for the ſtubborn or leſs tractable ores; and theſe are ſometimes ſo exceedingly hard to fuſe and reduce to a metalline form, that it requires the utmoſt power of art to treat them advantageouſly in the larger way of buſineſs, where no conſiderable expence can uſually be allowed for fluxes. And on this account it is, that many mines remain unwrought, as being untractable without great charges. Whence the improvement of the buſineſs of fluxes, ſo as to render them cheap and effectual, might greatly contribute to the improvement of metallurgy. The matter in ſoft ores, which renders them ſo fuſible, has been found by an experiment upon copper-ore, to be a kind of bituminous ſubſtance, capable of melting by a ſtrong heat, into a ſoft and black kind of glaſs.

Some of the moſt powerful and cheap ſimple fluxes hitherto known, are dried wine-lees, dried cow-dung and horſe-dung, dried river-mud, fuller's earth, iron-filings, common ſalt, glaſs, kelp, or pot-aſhes, ſandiver, &c. which may be uſed in the larger work; as nitre, tartar, borax, ſal ammoniac, mercury ſublimate, &c. may in the ſmaller, or for the making of aſſays.

As for compound fluxes, they are numerous; almoſt every operator having his favourite flux. And, certainly, ſome fluxes are better adapted than others to certain ores. But perhaps a few general ones might be fixed upon, which ſhould ſerve inſtead of all thoſe hitherto commonly known and uſed: we will here recommend three, which are powerful, almoſt general, and not expenſive.

1. Take of nitre, prepared by long boiling it in lime-water; of ſea-ſalt, melted in the fire; ſandiver; and dry wine-lees, each one part; glaſs of lead, three parts; and powdered glaſs, eight parts; mix them all well together. This flux added in an equal weight, will fuſe a very ſtubborn ore.

2. For a ſtill ſtronger, take equal parts of white tartar, common ſalt and nitre, prepared as above; calcine them to a white powder; and mix therewith its own weight of glaſs and lead; and of this flux add two parts to one of the moſt ſtubborn ore.

3. For a powerful ſaline flux. Take of the ſtrongeſt ſoap-boiler's lees, four pounds; white tartar and common ſalt melted in the fire, each one pound: boil them together with five gallons of human urine, to a dry ſalt. This flux is particularly proper where ſulphur and cobalt abound, and render the ore very refractory.

But the great ſecret, in making and adapting fluxes, is not only to ſeparate the metal already ripened in the ore, but even to mature and ripen the crude and immature part of the ore in the fire: ſomething of this kind, we apprehend, may be effected, as having reaſon to believe, that certain fluxes will obtain a larger yield of metal from certain ores, than other fluxes, in common uſe, though eſteemed of the beſt, and though they are perhaps of the deareſt kind. Thus clean iron filings will often do more than borax. But as the ſcales and crocus, or ruſt, of iron, have been commonly uſed, inſtead of pure and perfect iron itſelf, for a flux, few operators appear acquainted with the excellence of perfect iron employed for this purpoſe. And many advantages are now obtained, by a prudent mixing of one ore with another of the ſame denomination, and with the ſlags, or recrements of metals, in this way of flux.

The melting of gold and ſilver, and of their calxes, is greatly promoted by glaſs of lead, alkaline ſalts, &c. but when gold and ſilver, in the fuſion itſelf, are to be purged from other metals and ſemimetals, it is proper to uſe nitre only; or if not ſo, nitre always muſt be mixed with the other ſalts; for the ſemimetals and the four leſs perfect metals are deſtroyed by nitre.

In this operation, nitre, by its detonation with their ſulphurs, is in part alkaliſed, and, by the help of a gentle fire, turns their calxes into a vitreous and much attenuated ſcoriæ.

From hence, the reaſon is plain why gold and ſilver, when made brittle, are readily reſtored to their malleability by nitre; for the ſame metals, and among the metals lead and tin moſt of all, communicate this fault to gold and ſilver; but theſe being changed, as before obſerved, by nitre, and then rejected by gold and ſilver in a ſimple fuſion, ſo that they can no longer mix with theſe metals, unleſs they are themſelves firſt again reduced to their metallic ſtate; and there is beſide theſe, no other body that can be mixed with ſilver and gold, to render them brittle, unleſs crude charcoal, happening to fall into the veſſel wherein theſe metals are melted, ſhould impregnate them with ſomething arſenical; there being ſome arſenic contained in coals of this kind, as has been demonſtrated by Stahl and Hoffman.

The leſs perfect metals, and ſemi-metals, melt more eaſily by adding ſalts to them, than of themſelves: they always, however, loſe a great deal of their ſubſtance by this means; and this is more particularly the caſe in regard to copper and iron. To amend this, it is neceſſary to add ſome kind of fat body, which prevents the deſtruction, and even reduces the metals already deſtroyed; and this is more neceſſary when the calxes, prepared either by burning, or by a detonation with nitre, are to be reduced.

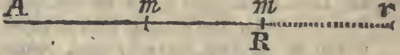
A caution, very neceſſary to be obſerved, is, that all fluxes muſt be kept and uſed very dry, for moiſt ſalts foam very much; and when the operations are made in cloſe veſſels, if the fire is quickly increaſed, not being able to get rid of the moiſture, the veſſels will ſplit and break.

Fluxes being greatly attenuated, though confined in cloſe veſſels, part with their oily principle, and their alkaline ſalt remaining, begin to corrode and conſume the veſſels, of what matter ſoever they are made, and finally make their way through them, and get out. The firſt of theſe accidents is prevented by adding coal-duſt, which will never part with its oil without the help of a free air; and the others by an admixture of common glaſs, made of a due mixture of flints, and fixed alkali; for this is ſufficiently fuſible, and melts with the fluxes; and by its viſcidity in ſome ſort coagulates and holds the ſalt of the flux together, and prevents it from eaſily corroding the veſſels.

FLUXION, in mathematics, denotes the velocity by which the fluents or flowing quantities increaſe or decreaſe; and may be conſidered as poſitive or negative, according as it relates to an increment or decrement.

The doctrine of fluxions, firſt invented by Sir Iſaac Newton, is of great uſe in the inveſtigation of curves, and in the diſcovery of the quadratures of curvilinear ſpaces, and their rectifications. In this method, magnitudes are conceived to be generated by motion, and the velocity of the generating motion is the fluxion of the magnitude. Thus, the velocity of the point that deſcribes a line, is its fluxion, and meaſures its increaſe or decreaſe. When the motion of this point is uniform, its fluxion or velocity is conſtant, and may be meaſured by the ſpace deſcribed in a given time. But when the motion varies, the fluxion or velocity at any given point is meaſured by the ſpace that would be deſcribed in a given time, if the motion was to be continued uniformly from that term.

Thus, let the point *m* be conceived to move from A, and generate the variable right line A *m*, by a motion any how regulated; and let its velocity, when it arrives at any propoſed poſition or point R, be ſuch as would, was it to continue uniform from that point, be ſufficient to deſcribe the line R *r*, in the given time allotted for the fluxion, then will R *r* be the fluxion of the variable line A *m*, in the term or point R. See the articles MOTION and VELOCITY.



The fluxion of a plain ſurface is conceived in like manner, by ſuppoſing a given right line *m n* (plate XCVIII. fig. 6. n° 1.) to move parallel to itſelf, in the plane of the parallel and moveable lines A F and B G: for if, as above, R *r* be taken to expreſs the fluxion of the line A *m*, and the rectangle R *r s* S be completed; then that rectangle, being the ſpace which would be uniformly deſcribed by the generating line *m n*, in the time that A *m* would be uniformly increaſed by *m r*, is therefore the fluxion of the generated rectangle B *m*, in that poſition.

If the length of the generating line *m n* continually varies, the fluxion of the area will ſtill be expounded by a rectangle under that line, and the fluxion of the abſciſs or baſe: for let the curvilinear ſpace A *n m* (*ibid.* n° 2.) be generated by the continual and parallel motion of the variable line *m n*; and let R *r* be the fluxion of the baſe or abſciſs A *m*, as before, then the rectangle R *r s* S, will be the fluxion of the generated ſpace A *m n*. Becauſe, if the length and velocity of the generating line *m n* were to continue invariable from the poſition R S, the rectangle R *r s* S would then be uniformly generated with the very velocity wherewith it begins to be generated, or with which the ſpace A *m u* is increaſed in that poſition.

Notation of FLUXIONS. Invariable quantities, or thoſe which neither increaſe nor decreaſe, are repreſented by the firſt letters of the alphabet, as *a*, *b*, *c*, *d*, *&c.* and the variable or flowing quantities by the laſt letters, as *v*, *w*, *x*, *y*, *z*: thus, the diameter of a given circle may be denoted by *a*; and the ſine of any arch thereof, conſidered as variable, by *x*. The fluxion of a quantity repreſented by a ſingle letter, is expreſſed by the ſame letter with a dot or full point over it: thus, the fluxion of x is repreſented by $\dot{x}$, and that of y by $\dot{y}$. And, becauſe theſe fluxions are themſelves often variable quantities, the velocities with which they either increaſe or decreaſe, are the fluxions of the former fluxions, which may be called ſecond fluxions, and are denoted by the ſame letters with two dots over them, as $\ddot{x}$, $\ddot{y}$. In the ſame manner the fluxions of ſecond fluxions are called third fluxions, and denoted by the ſame letters with three dots over them, as $\dddot{x}$, $\dddot{y}$; and ſo on for fourth, fifth, *&c.* fluxions, which are expreſſed by the ſame letters, with four, five, *&c.* dots over them, as $\ddddot{x}$, $\ddddot{y}$; and $\overset{:\cdot:}{x}$, $\overset{:\cdot:}{y}$, *&c.* If the flowing quantity be a fraction, as $\frac{xx}{d-y}$, its firſt, ſecond, third, *&c.* fluxions are expreſſed by one, two, three, *&c.* dots placed in the break of the line that ſeparates the numerator from the denominator, thus $\frac{xx}{d\overset{\cdot}{-}y}$, $\frac{xx}{d\overset{:}{-}y}$, $\frac{xx}{d\overset{\therefore}{-}y}$, *&c.*

The fluxions of ſurds denoted in the ſame manner, by one, two, or more dots placed in the break of the vinculum of the radical character: thus, if the ſurd quantity be $\sqrt{x-y}$, then will its firſt, ſecond, third, *&c.* fluxions be $\sqrt{x\overset{\cdot}{-}y}$, $\sqrt{x\overset{:}{-}y}$, $\sqrt{x\overset{\therefore}{-}y}$, *&c.*

The whole doctrine of fluxions conſiſts in ſolving the two following problems, *viz.* From the fluent, or variable flowing quantity given, to find the fluxion; which conſtitutes what is called the direct method of fluxions. 2. From the fluxion given, to find the fluent, or flowing quantity; which makes the inverſe method of fluxions.

Direct method of FLUXIONS. The doctrine of this part of fluxions is comprized in theſe rules.

1. To find the fluxion of any ſimple variable quantity, the rule is to place a dot over it: thus, the fluxion of x is $\dot{x}$, and of y, $\dot{y}$. Again, the fluxion of the compound quantity $x+y$, is $\dot{x}+\dot{y}$; alſo the fluxion of $x-y$, is $\dot{x}-\dot{y}$.

2. To find the fluxion of any given power of a variable quantity, multiply the fluxion of the root by the exponent of the power, and the product by that power of the ſame root, whoſe exponent is leſs by unity than the given exponent. This rule is expreſſed more briefly, in algebraical characters, by $nx^{n-1}\dot{x}=$ the fluxion of x^{n}. Thus, the fluxion of x^{3} is $\dot{x}\times 3\times x^{2}=3x^{2}\dot{x}$; and the fluxion of x^{5} is $\dot{x}\times 5\times x^{4}=5x^{4}\dot{x}$. In the ſame manner the fluxion of $\overline{a+y}|^{7}$ is $7\dot{y}\times\overline{a+y}|^{6}$; for the quantity *a* being conſtant, y is the true fluxion of the root $a+y$. Again, the fluxion of $\overline{a^{2}+z^{2}}|^{\frac{3}{2}}$ will be $\frac{3}{2}\times 2z\dot{z}\times\overline{a^{2}+z^{2}}|^{\frac{1}{2}}$: for here, x being put $=a^{2}+z^{2}$, we have $\dot{x}=2z\dot{z}$; and therefore $\frac{3}{2}x^{\frac{1}{2}}\dot{x}$, for the fluxion of $x^{\frac{3}{2}}$ (or $\overline{a^{2}+z^{2}}|^{\frac{3}{2}}$) is $=3z\dot{z}\sqrt{a^{2}+z^{2}}$.

3. To find the fluxion of the product of ſeveral variable quantities, multiply the fluxion of each, by the product of the reſt of the quantities; and the ſum of the products, thus ariſing, will be the fluxion ſought. Thus, the fluxion of xy is $\dot{x}y+\dot{y}x$; that of xyz, is $\dot{x}yz+\dot{y}xz+\dot{z}xy$; and that of $vxyz$ is $\dot{v}xyz+\dot{x}vyz+\dot{y}vxz+\dot{z}vxy$. Again, the fluxion of $\overline{a+x}\times\overline{b-y}=ab+bx-ay-xy$, is $b\dot{x}-a\dot{y}-\dot{x}y-\dot{y}x$.

4. To find the fluxion of a fraction, the rule is, from the fluxion of the numerator multiplied by the denominator, ſubtract the fluxion of the denominator multiplied by the numerator, and divide the remainder by the ſquare of the denominator. Thus the fluxion of $\frac{x}{y}$, is $\frac{y\dot{x}-x\dot{y}}{y^{2}}$; that of $\frac{x}{x+y}$, is $\frac{\dot{x}\times\overline{x+y}-\overline{\dot{x}+\dot{y}}\times x}{\overline{x+y}|^{2}}=\frac{y\dot{x}-x\dot{y}}{\overline{x+y}|^{2}}$; and that of $\frac{x+y+z}{x+y}$, or

1+

$1+\frac{z}{x+y}$, is $\frac{\dot{z}\times\overline{x+y}-\overline{\dot{x}+\dot{y}}\times z}{\overline{x+y}|^{2}}$; and ſo of others.

In the examples hitherto given, each is reſolved by its own particular rule; but in thoſe that follow, the uſe of two or more of the above rules is requiſite: thus (by rule 2. and 3.) the fluxion of x^2y^2 is found to be $2x^2y\dot{y}+2y^2x\dot{x}$; that of $\frac{x^2}{y^2}$, is found (by rule 2. and 4.) to be $\frac{2y^2x\dot{x}-2x^2y\dot{y}}{y^4}$; and that of $\frac{x^2y^2}{z}$, is (by rule 2. 3. and 4.) found to be $\frac{2x^2y\dot{y}+2y^2x\dot{x}\times z-x^2y^2\dot{z}}{z^2}$.

5. When the propoſed quantity is affected by a coefficient, or conſtant multiplicator, the fluxion found as above muſt be multiplied by that coefficient or multiplicator: thus, the fluxion of $5x^3$, is $15x^2\dot{x}$; for the fluxion of x^3 is $3x^2\dot{x}$, which, multiplied by 5, gives $15x^2\dot{x}$. And, in the very ſame manner, the fluxion of ax^n will be $nax^{n-1}\dot{x}$.

Having thus explained the manner of determining the firſt fluxions of variable quantities, it remains to ſay ſomething of ſecond, third, &c. fluxions. We have already obſerved, that the ſecond fluxion of a quantity is the fluxion of the firſt fluxion; and by the third fluxion is meant the fluxion of the ſecond; the fourth, of the third; and ſo on. The fluxions, therefore, of every order are only the meaſures of the velocities by which their reſpective flowing quantities, *viz.* the fluxions of the immediately preceding order, are generated. Hence it appears, that a ſecond fluxion always ſhews the rate of the increaſe or decreaſe of the firſt fluxion; and that the third, fourth, &c. fluxions differ in nothing, except their order and notation, from firſt fluxions; and therefore are alſo determinable in the very ſame manner, by the rules already laid down: thus (by rule 4.) the (firſt) fluxion of x^3 is $3x^2\dot{x}$: and if $\dot{x}$ is ſuppoſed conſtant, that is, if the root x be generated with an equable or uniform velocity, the fluxion of $3x^2\dot{x}$ (or $3\dot{x}\times x^2$) again taken (by the ſame rule) will be $3\dot{x}\times 2x\dot{x}$, or $6x\dot{x}^2$; which therefore is the ſecond fluxion of x^3. Again, the third fluxion of x^3, or the fluxion of $6x\dot{x}^2$, is found to be $6\dot{x}^3$; further than which we cannot go in this caſe, becauſe the laſt fluxion $6\dot{x}^3$, is here a conſtant quantity.

In the preceding example, the root x is ſuppoſed to be generated with an equable velocity: but if the velocity be an increaſing or decreaſing one, then $\dot{x}$, expreſſing the meaſure thereof, being variable, will alſo have its fluxion, which is denoted, as ſaid above, by $\ddot{x}$; and the fluxion of $\ddot{x}$ by $\dddot{x}$, and ſo on, with reſpect to the higher orders.

Here follow ſome examples, wherein the root x (or y) is ſuppoſed to be generated with a variable velocity. Thus, the fluxion of x^3 being $3x^2\dot{x}$ (or $3x^2\times\dot{x}$) the fluxion of $3x^2\times\dot{x}$, conſidered as a rectangle, will (by rule 3.) be found to be $6\dot{x}x\times\dot{x}+3x^2\times\ddot{x}=6x\dot{x}^2+3x^2\ddot{x}$; which is the ſecond fluxion of x^3. Moreover, from the fluxion laſt found, we ſhall in like manner get $6\dot{x}\times\dot{x}^2+6x\times 2\dot{x}\ddot{x}+6x\dot{x}\times\ddot{x}+3x^2\times\dddot{x}$ (or $6\dot{x}^3+18x\dot{x}\ddot{x}+3x^2\dddot{x}$) for the third fluxion of x^3. Thus alſo, if $\dot{y}=nx^{n-1}\dot{x}$, then will $\ddot{y}=n\times\overline{n-1}\times x^{n-2}x^2+n\ddot{x}x^{n-1}$; and if $\dot{z}^2=\dot{x}\dot{y}$, then will $2\dot{z}\ddot{z}=\dot{x}\ddot{y}+\dot{y}\ddot{x}$: and ſo of others.

The reader is here deſired, once for all, to take particular notice, that the fluxions of all kinds and orders whatever, are contemporaneous, or ſuch as may be generated together, with their reſpective velocities, in one and the ſame time.

Inverſe method of FLUXIONS, or the manner of determining the fluents of given fluxions.

If what is already delivered, concerning the direct method, be duly conſidered, there will be no great difficulty in conceiving the reaſons of the inverſe method: though the difficulties that occur in this laſt part, upon another account, are indeed vaſtly great. It is an eaſy matter, or not impoſſible at moſt, to find the fluxion of any flowing quantity whatever; but, in the inverſe method, the caſe is quite otherwiſe; for, as there is no method for deducing the fluent from the fluxion *a priori*, by a direct inveſtigation; ſo it is impoſſible to lay down rules for any other forms of fluxions, than thoſe particular ones that we know, from the direct method, belong to ſuch and ſuch kinds of flowing quantities: thus, for example, the fluent of $2x\dot{x}$ is known to be x^2; becauſe, by the direct method, the fluxion of x^2 is found to be $2x\dot{x}$: but the fluent of $y\dot{x}$ is unknown, ſince no expreſſion has been diſcovered that produces $y\dot{x}$ for its fluxion. Be this as it will, the following rules are thoſe uſed by the beſt mathematicians, for finding the fluents of given fluxions.

1. To find the fluent of any ſimple fluxion, you need only write the letters without the dots over them: thus, the fluent of $\dot{x}$ is x, and that of $a\dot{x}+b\dot{y}$, is $ax+by$.

2. To aſſign the fluent of any power of a variable quantity, multiplied by the fluxion of the root; firſt divide by the fluxion of the root, add unity to the exponent of the power, and divide by the exponent ſo increaſed: for dividing the fluxion $nx^{n-1}\dot{x}$ by $\dot{x}$, it becomes nx^{n-1}; and adding 1 to the exponent $(n-1)$ we have nx^{n}; which, divided by n, gives x^{n}, the true fluent of $nx^{n\quad 1}\dot{x}$. Hence, by the ſame rule, the fluent of $3x^{2}\dot{x}$ will be $= x^{3}$; that of $2x^{5}\dot{x} = \frac{x^{6}}{3}$; that of $y^{\frac{1}{2}}\dot{y} = \frac{2}{3}y^{\frac{3}{2}}$; that of $ay^{\frac{5}{3}}\dot{y} = \frac{3ay^{\frac{8}{3}}}{8}$; and that of $y^{\frac{m}{n}}\dot{y} = \frac{y^{\frac{m}{n}+1}}{\frac{m}{n}+1} = \frac{ny^{\frac{m+n}{n}}}{m+n}$; that of $\frac{a\dot{x}}{x^{n}}$, or $a\dot{x}x^{-n} = \frac{ax^{1-n}}{1-n}$; that of $\overline{a+z}|^{3} \times \dot{z} = \frac{\overline{a+z}|^{4}}{4}$; and that of $\overline{a^{m}+z^{m}}|^{n} \times z^{m-1}\dot{z} = \frac{\overline{a^{m}+z^{m}}|^{n+1}}{m\times\overline{n+1}}$.

In aſſigning the fluents of given fluxions, it ought to be conſidered, whether the flowing quantity, found as above, requires the addition or ſubtraction of ſome conſtant quantity, to render it complete: thus, for inſtance, the fluent of $nx^{n-1}\dot{x}$ may be either repreſented by x^{n} or by $x \pm a$; for a being a conſtant quantity, the fluxion of $x^{n}\pm a$, as well as of x^{n}, is $nx^{n-1}\dot{x}$.

Hence it appears, that the variable part of a fluent only can be aſſigned by the common method, the conſtant part being only aſſignable from the particular nature of the problem. Now to do this, the beſt way is to conſider how much the variable part of the fluent, firſt found, differs from the truth, when the quantity which the whole fluent ought to expreſs, is equal to nothing; then that difference, added to, or ſubtracted from, the ſaid variable part, as occaſion requires, will give the fluent truly corrected. To make this plainer by an example or two, let $\dot{y} = \overline{a+x}|^{3} \times \dot{x}$. Here we firſt find $y = \frac{\overline{a+x}|^{4}}{4}$; but when $y = 0$, then $\frac{\overline{a+x}|^{4}}{4}$ becomes $= \frac{a^{4}}{4}$; ſince x, by hypotheſis, is then $= 0$: therefore $\frac{\overline{a+x}|^{4}}{4}$ always exceeds y by $\frac{a^{4}}{4}$; and ſo the fluent, properly corrected, will be $y = \frac{\overline{a+x}|^{4}-a^{4}}{4} = a^{3}x + \frac{3a^{2}x^{2}}{2} + ax^{3} + \frac{x^{4}}{4}$. Again, let $\dot{y} = \overline{a^{m}+x^{m}}|^{n} \times x^{m-1}\dot{x}$: here we firſt have $y = \frac{\overline{a^{m}+x^{m}}|^{n+1}}{m\times\overline{n+1}}$; and making $y = 0$, the latter part of the equation becomes $\frac{\overline{a^{m}}|^{n+1}}{m\times\overline{n+1}} = \frac{a^{mn+m}}{m\times\overline{n+1}}$; whence the equation or fluent, properly corrected, is $y = \frac{\overline{a^{m}+x^{m}}|^{n+1} - a^{mn+m}}{m\times\overline{n+1}}$.

Hitherto x and y are both ſuppoſed equal to nothing, at the ſame time; which will not always be the caſe: thus, for inſtance, though the ſine and tangent of an arch are both equal to nothing, when the arch itſelf is ſo; yet the ſecant is then equal to the radius. It will therefore be proper to add ſome examples, wherein the value of y is equal to nothing, when that of x is equal to any given quantity a. Thus, let the equation $\dot{y} = {}^{2}\dot{x}$, be propoſed; whereof the fluent firſt found is $y = \frac{x^{3}}{3}$; but when $y = 0$, then $\frac{x^{3}}{3} = \frac{a^{3}}{3}$, by the hypotheſis; therefore the fluent, corrected, is $y = \frac{x^{3}-a^{3}}{3}$. Again, ſuppoſe $\dot{y} = x^{n}\dot{x}$; then will $y = \frac{x^{n+1}}{n+1}$; which, corrected, becomes $y=\frac{a^{n+1}-x^{n+1}}{n+1}$. And laſtly, if $\dot{y}=\overline{c^3+bx^2}|^{\frac{1}{2}}\times x\dot{x}$; then, firſt, $y=\frac{\overline{c^3+bx^2}|^{\frac{3}{2}}}{3b}$: therefore the fluent corrected is $y=\frac{\overline{c^3+bx^2}|^{\frac{3}{2}}-\overline{c^3+ba^2}|^{\frac{3}{2}}}{3b}$.

3. To find the fluents of ſuch fluxionary expreſſions as involve two or more variable quantities, ſubſtitute, inſtead of ſuch fluxion, its reſpective flowing quantity; and, adding all the terms together, divide the ſum by the number of terms, and the quotient will be the fluent. Thus, the fluent of $\dot{x}y+\dot{y}x=\frac{xy+xy}{2}=\frac{2xy}{2}=xy$; and the fluent of $\dot{x}yz+\dot{y}xz+\dot{z}yx=\frac{xyz+xyz+xyz}{3}=\frac{3xyz}{3}=xyz$. But it ſeldom happens that theſe kinds of fluxions, which involve two variable quantities in one term, and yet admit of known and perfect fluents, are to be met with in practice.

Having thus ſhewn the manner of finding ſuch fluents as can be truly exhibited in algebraic terms, it remains now to ſay ſomething with regard to thoſe other forms of expreſſions involving one variable quantity only; which yet are ſo affected by compound diviſors and radical quantities, that their fluents cannot be accurately determined by any method whatſoever. The only method with regard to theſe, of which there are innumerable kinds, is to find their fluents by approximation, which, by the method of infinite ſeries, may be done to any degree of exactneſs. See the article SERIES.

Thus, if it were propoſed to find the fluent of $\frac{a\dot{x}}{a-x}$, it becomes neceſſary to throw the fluxion into an infinite ſeries, by dividing $a\dot{x}$ by $a-x$: thus, $a\dot{x}\div\overline{a-x}=\dot{x}+\frac{x\dot{x}}{a}+\frac{x^2\dot{x}}{a^2}+\frac{x^3\dot{x}}{a^3}+\frac{x^4\dot{x}}{a^4}+$, &c. Now the fluent of each term of this ſeries, may be found by the foregoing rules to be $x+\frac{x^2}{2a}+\frac{x^3}{3a^2}+\frac{x^4}{4a^3}+\frac{x^5}{5a^4}+$, &c.

Again, to approximate the fluent of $\frac{\overline{a^2-x^2}|^{\frac{1}{2}}\times x^n\dot{x}}{\overline{c^2-x^2}|^{\frac{1}{2}}}$, we firſt find the value of $\frac{\overline{a^2-x^2}|^{\frac{1}{2}}}{\overline{c^2-x^2}|^{\frac{1}{2}}}$ expreſſed in a ſeries to be $\frac{a}{c}+\overline{\frac{a}{2c^3}-\frac{1}{2ac}}\times x^2+\overline{\frac{3a}{8c^5}-\frac{1}{4ac^3}-\frac{1}{8a^3c}}\times x^4+\overline{\frac{5a}{16c^7}-\frac{3}{16ac^5}-\frac{1}{16a^3c^3}-\frac{1}{16a^5c}}\times x^6+$, &c. which value being multiplied by $x^n\dot{x}$, and the fluent taken by the rules above laid down, we get $\frac{ax^{n+1}}{\overline{n+1}\times c}+\overline{\frac{a}{2c^3}-\frac{1}{2ac}}\times\frac{x^{n+3}}{n+3}+\overline{\frac{3a}{8c^5}-\frac{1}{4ac^3}-\frac{1}{8a^3c}}\times\frac{x^{n+5}}{n+5}+\overline{\frac{5a}{16c^7}-\frac{3}{16ac^5}-\frac{1}{16a^3c^3}-\frac{1}{16a^5c}}\times\frac{x^{n+7}}{n+7}+$, &c.

In order to ſhew the uſefulneſs of fluxions, we ſhall give an example or two. Thus, ſuppoſe it were required to divide the given right line A B into two ſuch parts, A C, C B, that their products or rectangles, may be the greateſt poſſible. Let $AB=a$, and let the part A C, conſidered as variable (by the motion of C towards B) be denoted by x. Then BC being $=a-x$, we have $AC\times BC=ax-xx$, whoſe fluxion $a\dot{x}-2x\dot{x}$ being put $=0$, we get $a\dot{x}=2x\dot{x}$; and, conſequently, $x=\frac{1}{2}a$. Hence it appears that A C (or x) muſt be exactly one half of A B.

Again, ſuppoſe it were required to find the ſolid contents of a ſpheroid, AFBH (plate XCVIII. fig. 6. n° 3.) Let the axis A B, about which the ſolid is generated, be $=a$, the radius $=p=1$, and the other axis F H of the generating ellipſis $=b$; then, from the property of the ellipſis, we have $a^2:b^2::AD\times BD$ $(x\times\overline{a-x})$: DE^2 (y^2). Hence $y^2=\frac{b^2}{a^2}\times\overline{ax-xx}$; and the fluxion of the ſolid $\dot{s}$ $(=py^2\dot{x})=\frac{pb^2}{a^2}\times\overline{ax\dot{x}-x^2\dot{x}}$; and the ſolidity $s=\frac{pb^2}{a^2}\times\overline{\tfrac{1}{2}axx-\tfrac{1}{3}x^3}$ = the ſegment AIE; which, when AD (x) = AB (a), becomes $\left(\frac{pb^2}{a^2}\times\overline{\tfrac{1}{2}a^3-\tfrac{1}{3}a^3}\right)$

$\frac{1}{6}pab^2 =$ the content of the whole ſpheroid. Where, if b (F H) be taken $= a$ (A B), we ſhall alſo get $\frac{1}{6}pa^3$ for the true content of the ſphere, whoſe diameter is a. Hence a ſphere or ſpheroid is $\frac{2}{3}$ of its circumſcribing cylinder: for the area of the circle F H being expreſſed by $\frac{pb^2}{4}$, the content of the cylinder whoſe diameter is F H, and altitude A B, will be $\frac{pb^2a}{4}$; of which $\frac{1}{6}pab^2$ is evidently two third parts.

For the other uſes of fluxions, ſee the articles MAXIMUM, QUADRATURE, TANGENT, SOLID, &c.

FLUXION, or rather DEFLUXION, in medicine. See the article DEFLUXION.

FLY, in zoology, a large order of inſects, the diſtinguiſhing characteriſtic of which is, that their wings are tranſparent; by this they are diſtinguiſhed from beetles, butterflies, and graſshoppers. See the articles BEETLE, BUTTERFLY, &c.

Flies are ſubdivided into thoſe which have four, and thoſe which have two wings.

Of thoſe with four wings, there are ſeveral genera or kinds, as the ant, apis, tenthredo, ichneumon, &c. See the articles ANT, APIS, &c.

Of thoſe with two wings there are likewiſe ſeveral kinds, as the gad-fly, waſp-fly, gnat, tipula, &c. See GAD-FLY, &c.

Thoſe who deſire a more particular account of the anatomy, generation, ſtructure, and manifold ſubdiviſions of flies, may conſult Reaumur's Hiſtory of Inſects, tom. 4.

FLY, in mechanics, a croſs with leaden weights at its ends, or rather a heavy wheel at right angles to the axis of a windlas, jack, or the like; by means of which the force of the power, whatever it be, is not only preſerved, but equally diſtributed in all parts of the revolution of the machine.

The fly may be applied to ſeveral ſorts of engines, whether moved by men, horſes, wind, or water, or any other animate or inanimate power; and is of great uſe in thoſe parts of an engine which have a quick circular motion, and where the power of the reſiſtance act unequally in the different parts of a revolution. This has made ſome people imagine, that the fly adds a new power; but tho' it may be truly ſaid to facilitate the motion, by making it more uniform, yet upon the whole it cauſes a loſs of power, and not an increaſe: for as the fly has no motion of its own, it certainly requires a conſtant force to keep it in motion; not to mention the friction of the pivots of the axis, and the reſiſtance of the air. The reaſon, therefore, why the fly becomes uſeful in many engines, is not that it adds a new force to them; but becauſe, in caſes where the power acts unequally, it ſerves as a moderator to make the motion of revolution almoſt every where equal: for as the fly has accumulated in itſelf a great degree of power, which it equally and gradually exerts, and as equally and gradually receives, it makes the motion in all parts of the revolution pretty nearly equal and uniform. The conſequence of this is, that the engine becomes more eaſy and convenient to be acted and moved by the impelling force; and this is the only benefit obtained by the fly.

The beſt form for a fly, is that of a heavy wheel or circle, of a fit ſize, as this will not only meet with leſs reſiſtance from the air, but being continuous, and the weight every where equally diſtributed through the perimeter of the wheel, the motion will be more eaſy, uniform, and regular. In this form, the fly is moſt aptly applied to the perpendicular drill, which it likewiſe ſerves to keep upright by it centrifugal force: alſo to a windlas or common winch, where the motion is quick; for in pulling upwards from the lower part, a perſon can exerciſe more power than in thruſting forward in the upper quarter: where, of courſe, part of his force would be loſt, were it not accumulated and conſerved in the equable motion of the fly. Hence, by this means, a man may work all day in drawing up a weight of 40 lb. whereas 30 lb. would create him more labour in a day without the fly.

In order to calculate the force of the fly joined to the ſcrew for ſtamping the image upon coins, let us ſuppoſe the two arms of the fly to be each fifteen inches long, meaſuring from the center of the weight to the axis of motion, the weights to be fifty pounds each, and the diameter of the axis preſſing upon the dye, to be one inch. If every ſtroke be made in half a ſecond, and the weights deſcribe an half circumference, which in this caſe will be four feet, the velocity will at the inſtant of the ſtroke be at the rate of eight feet in a ſecond, ſo that the momentum of it will be 800; but the arms of the fly being as levers, each fifteen inches long, whilſt the ſemi-axis is only half an inch, we muſt increaſe this force thirty times, which will give 24000; an immenſe force, equal to 100 ℔. falling 120 feet, or near two ſeconds in time; or to a body of 750 ℔. falling 16 $\frac{1}{12}$ feet, or one ſecond in time. Some of the engines for coining crown-pieces have the arms of the fly five times as long, and the weights twice as heavy; ſo that the effect is ten times greater. See the article COINING.

FLY, in the ſea-language, that part of the mariner's compaſs, on which the ſeveral winds or points are drawn. See the article COMPASS.

Let fly the ſheet, is a word of command to let looſe the ſheet, in caſe of a guſt of wind, leſt the ſhip ſhould overſet, or ſpend her top-ſails and maſts; which is prevented by letting the ſheet go a-main, that it may hold no wind.

FLY, among ſportſmen. When a hawk miſſing her quarry, betakes herſelf to the next check, as crows, *&c.* they ſay ſhe *flies on head*. When a hawk flies at great birds, as cranes, geeſe, *&c.* they ſay ſhe *flies groſs*. A horſe is ſaid to fly the heels, when he obeys the ſpurs.

FLY-BOAT, a large veſſel with a double prow, carrying from ſeven to eight hundred weight of goods.

FLYERS, in architecture, ſuch ſtairs as go ſtraight, and do not wind round; nor have the ſteps made tapering, but the fore and back part of each ſtair, and the ends, reſpectively parallel to one another; ſo that if one flight do not carry you to your intended height, there is a broad half ſpace, from whence you begin to fly again, with ſteps every where of the ſame length and breadth, as before.

FLYING, the progreſſive motion of a bird, or other winged animal, in the liquid air. The parts of birds chiefly concerned in flying, are the wings, by which they are ſuſtained or wafted along. The tail, Meſſeurs Willoughby, Ray, and many others, imagine to be principally employed in ſteering and turning the body in the air, as a rudder: but Borelli has put it beyond all doubt, that this is the leaſt uſe of it, which is chiefly to aſſiſt the bird in its aſcent and deſcent in the air; and to obviate the vacillations of the body and wings: for, as to turning to this or that ſide, it is performed by the wings, and inclinations of the body, and but very little by the help of the tail. The flying of a bird, in effect, is quite a different thing from the rowing of a veſſel. Birds do not vibrate their wings towards the tail, as oars are ſtruck towards the ſtern, but waft them downwards: nor does the tail of the bird cut the air at right angles, as the rudder does the water; but is diſpoſed horizontally, and preſerves the ſame ſituation what way ſoever the bird turns.

In effect, as a veſſel is turned about on its center of gravity to the right, by a briſk application of the oars to the left, ſo a bird in beating the air with its right wing alone, towards the tail, will turn its fore part to the left. Thus pigeons, changing their courſe to the left, would labour it with their right wing, keeping the other almoſt at reſt. Birds of a long neck alter their courſe by the inclinations of their head and neck, which altering the courſe of gravity, the bird will proceed in a new direction.

The manner of FLYING is thus: the bird firſt bends his legs, and ſprings with a violent leap from the ground; then opens and expands the joints of his wings, ſo as to make a right line perpendicular to the ſides of his body: thus the wings, with all the feathers therein, conſtitute one continued lamina. Being now raiſed a little above the horizon, and vibrating the wings with great force and velocity perpendicularly againſt the ſubject air, that fluid reſiſts thoſe ſuccuſſions, both from its natural inactivity and elaſticity, by means of which the whole body of the bird is protruded. The reſiſtance the air makes to the withdrawing of the wings, and conſequently the progreſs of the bird, will be ſo much the greater, as the waft or ſtroke of the fan of the wing is longer: but as the force of the wing is continually diminiſhed by this reſiſtance, when the two forces come to be in equilibrio, the bird will remain ſuſpended in the ſame place; for the bird only aſcends ſo long as the arch of air the wing deſcribes, makes a reſiſtance equal to the exceſs of the ſpecific gravity of the bird above the air. If the air, therefore, be ſo rare as to give way with the ſame velocity as it is ſtruck withal, there will be no reſiſtance, and conſequently the bird can never mount. Birds never fly upwards in a perpendicular line, but always in a parabola. In a direct aſcent, the natural and artificial tendency would oppoſe and deſtroy each other, ſo that the progreſs would be very ſlow. In a direct deſcent they would aid one another, ſo that the fall would be too precipitate.

Artificial **FLYING**, that attempted by men, by the aſſiſtance of mechanics.

The art of flying has been attempted by ſeveral perſons in all ages. The Leucadians, out of ſuperſtition, are reported to have had a cuſtom of precipitating a man from a high cliff into the ſea, firſt fixing feathers, variouſly expanded, round his body, in order to break his fall. Frier Bacon, who lived near five hundred years ago, not only affirms the art of flying poſſible, but aſſures us, that he himſelf knew how to make an engine wherein a man ſitting might be able to convey himſelf through the air, like a bird; and further adds, that there was then one who had tried it with ſucceſs: but this method, which conſiſted of a couple of large, thin, hollow copper globes, exhauſted of the air, and ſuſtaining a perſon who ſat thereon, Dr. Hook ſhews to be impracticable. The philoſophers of K. Charles the ſecond's reign, were mightily buſied about this art. The famous biſhop Wilkins was ſo confident of ſucceſs in it, that he ſays, he does not queſtion but, in future ages, it will be as uſual to hear a man call for his wings, when he is going a journey, as it is now to call for his boots.

FLYING-ARMY, a ſmall body under a lieutenant or major general, ſent to harraſs the country, intercept convoys, prevent the enemy's incurſions, cover its own garriſons, and keep the enemy in continual alarm.

FLYING-BRIDGE. See the article BRIDGE.

FLYING-CAMP. See the article CAMP.

FLYING-FISH, a name given by the engliſh writers to ſeveral ſpecies of fiſh, which, by means of their long fins, have a method of keeping themſelves out of water a long time. See the article EXOCOETUS, MILVUS, *&c.*

FLYING PINION, is part of a clock, having a fly, or fan, whereby to gather air, and ſo bridle the rapidity of the clock's motion, when the weight deſcends in the ſtriking part. See the article CLOCK.

FOAL, or COLT, the young of the horſe kind. The word colt among the dealers, is underſtood of the male kind.

Foals are uſually foaled about the beginning of ſummer, and it is the cuſtom to let them run till Michaelmas with the mare, at which time they are to be weaned. Some, however, are of opinion, that a foal is rendered much ſooner fit for ſervice by being allowed to ſuck the whole winter, and weaned about Candlemas or Shrovetide. When firſt weaned, the muſt be kept in a convenient houſe, with a low rack and manger for hay and oats; the hay muſt be very ſweet and fine, eſpecially at firſt, and a little white bran ſhould be mixed with their oats, in order to keep their bodies open, and make them eat and drink freely.

When foals are kept up in the winter, they are not to be immured continually in the ſtable; but in the middle of the day, when the ſun ſhines warm, they ſhould always be allowed to play about for an hour or two, and when the winter is ſpent, they ſhould be turned into ſome dry ground where the graſs is ſweet and ſhort, and where there is good water, that they may drink at pleaſure. The winter after this, they may be kept in the ſtable without any further care than that which is taken of other horſes; but after the firſt year, the mare foals and horſe foals are not to be kept together.

There is no difficulty to know the ſhape a foal is like to be of; for the ſame ſhape he carries at a month, he will carry at ſix years old, if he be not abuſed in after keeping. As for his heighth, it is obſerved that a large ſhin bone, long from the knee to the paſtern, ſhews a tall horſe; for which another way is to ſee what ſpace he has between his knee and his withers, which being doubled, it will be his height when he is a full aged horſe. There are alſo means of knowing their goodneſs; for if they are of ſtirring ſpirits, free from frights, wanton of diſpoſition, and very active in leaping and running, and ſtriving for maſtery, they prove generally good mettled horſes. It is a good mark alſo if their hoofs be ſtrong, deep, tough, ſmooth, upright ſtanding, and hollow. For the manner of breaking them, ſee the article HORSE.

FOCAGE, the ſame with fire-bote. See the article FIRE-BOTE.

FOCHEN, a town of China, capital of the province of Fokien: eaſt long. 118°, north lat. 26° 20′.

FOCUS, in geometry and conic ſections, is applied to certain points in the parabola, ellipſis, and hyperbola, where the rays reflected from all parts of theſe curves concur and meet.

FOCI *of an ellipſis*, are two points in the longeſt axis, on which as centers the figure is deſcribed. See ELLIPSIS.

If from the foci two right lines are drawn, meeting one another in the periphery of the ellipſis, their ſum will be

Fig. 1. FOCUS.

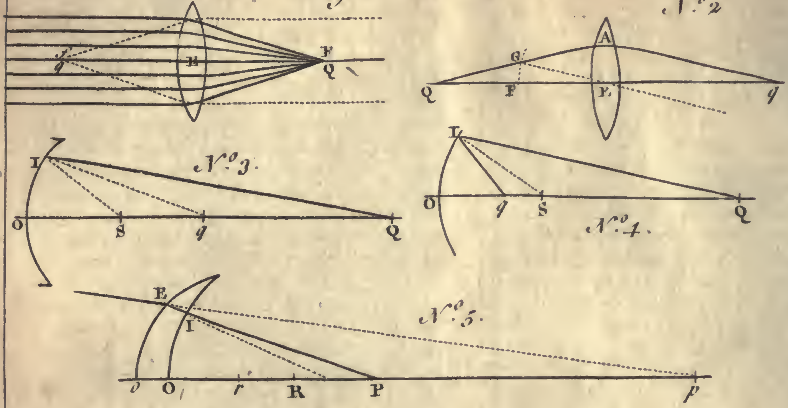


Fig. 2. FORCE.

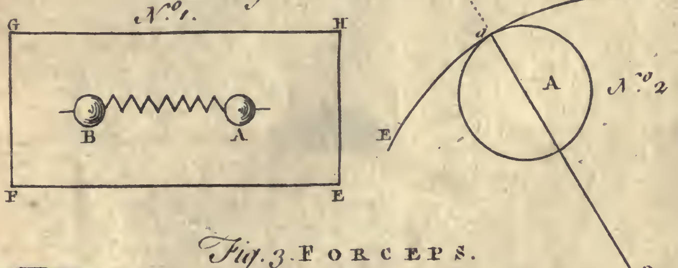


Fig. 3. FORCEPS.

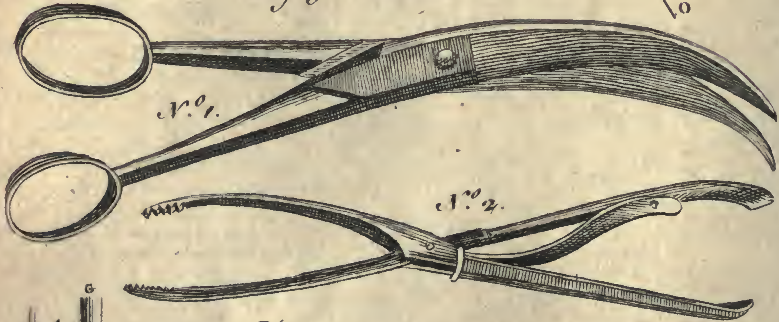
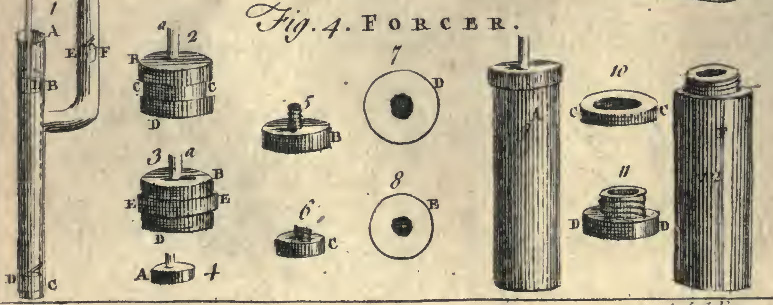


Fig. 4. FORCER.



J. Jeffreys sculp.

always equal to the longeſt axis; and therefore when an ellipſis and its two axes are given, and the foci are required, you need only take half the longeſt axis in your compaſſes, and ſetting one foot in the end of the ſhorter, the other foot will cut the longer in the focus required.

FOCUS *of an hyperbola*, is that point in the axis, through which the latus rectum paſſes; from whence if any two right lines are drawn meeting in either of the oppoſite hyperbolas, their difference will be equal to the principal axis. See the article HYPERBOLA.

FOCUS *of a parabola*, a point in the axis within the figure, diſtant from the vertex one fourth part of the latus rectum. See the article PARABOLA.

FOCUS, in optics, is the point wherein rays are collected, after they have undergone reflection or refraction. See the articles MIRROUR and LENS.

Principal FOCI *of a lens*, are the two foci F, *f*, (plate CI. fig. 1. n° 1.) of rays coming parallel to the axis of the lens, and E F or or E*f* is called its focal diſtance, and by authors its focal length.

It appears from the laws of optics, as well as from experiments, that the focal diſtance of a plano-convex, or of a plano-concave glaſs, is equal to a diameter of its convex or concave ſurfaces; that is, of the whole ſphere it belongs to; ſecondly, that the focal diſtance of a double convex or a double concave glaſs of equal convexities or concavities, is equal to a ſemi-diameter of either of its ſurfaces: and conſequently that the focal diſtance of a glaſs of unequal convexities or unequal concavities, will have an intermediate length between a diameter and a ſemi-diameter of that ſurface which is moſt convex or moſt concave.

Virtual FOCUS, a term uſed by Mr. Molyneux for that point from which refracted rays begin to diverge. It is alſo called the point of diſperſion or divergency.

It is remarkable, 1. That in concave glaſſes, when a ray falls from air parallel to the axis, the virtual focus by its firſt refraction, is at the diſtance of a diameter and a half of the concavity. 2. In plano-concave glaſſes, when the rays fall parallel to the axis, the virtual focus is diſtant from the glaſs the diameter of the concavity. 3. In plano-concave glaſſes, as 107 to 193, ſo is the radius of the concavity to the diſtance of the virtual focus. 4. In double concaves of the ſame ſphere, parallel rays have their virtual focus at the diſtance of the radius of the concavity. 5. But whether the concavities be equal or unequal, the virtual focus or point of divergency of the parallel rays is determined by this rule. As the ſum of the radii of both concavities is to the radius of either concavity, : : ſo is the double radius of the other concavity : to the diſtance of the virtual focus. 6. In concave glaſſes, if the point to which the incident ray converges be diſtant from the glaſs farther than the virtual focus of parallel rays, the rule for finding the virtual focus of this ray is this. As the difference of the diſtance between this point from the glaſs, and the diſtance of the virtual focus from the glaſs : is to the diſtance of the virtual focus : : ſo is the diſtance of this point of convergence from the glaſs : to the diſtance of the virtual focus of this converging ray. 7. In concave glaſſes, if the point to which the incident ray converges be nigher to the glaſs than the virtual focus of parallel rays, the rule to find where it croſſes the axis is this. As the exceſs of the virtual focus more than this point of convergency : is to the virtual focus : : ſo is the diſtance of this point of convergency from the glaſs : to the diſtance of the point where this ray croſſes the axis.

The FOCUS *of incident rays upon a lens being given, to find the* FOCUS *of the emergent rays.* Let Q (*ibid.* n° 2.) be the focus of incident rays given, and *q* the focus of emergent rays required; draw Q E the axis of the pencil, and with the center E and ſemidiameter E F, equal to the focal diſtance of the lens, deſcribe an arch F G, cutting any incident ray Q A in G; join E G, and drawing A *q* parallel to it, the point *q*, where it cuts the axis of the pencil, will be the focus of the emergent rays. For ſuppoſing other rays, beſides G A, to flow from or towards G, they will emerge parallel to their axis G E produced.

The FOCUS *of rays falling almoſt perpendicularly upon a given ſpherical ſurface being given, to find their focus after refractions.* Let O I (*ibid.* n° 3.) be the given ſurface, whoſe center is S; and in any radius O S produced, let Q be the given focus of the incident rays as Q I, it is required to find the focus *q* of the refracted rays. Call O S, O Q, O *q* reſpectively S, Q, *q*; and let the given ratio of the ſines of refraction be *m* to *n*, and let *m* be bigger than *n*. Then joining S I, S I, ſince very ſmall angles are very nearly proportionable to their ſines, we have the angle O S I : to the angle S I Q :: Q : $Q-S$, and the angle S I Q : to the angle S I q :: m : n. And by compounding theſe proportions we have the angle O S I : to the angle S I q :: mQ : $nQ-nS$, and disjointly we have the angle O S I : to the angle S q I, that is q : S :: $mQ : \overline{m-n}\,Q+nS$. Whence, putting $\theta = m-n$, we have this theorem, $q = \frac{mQS}{\theta Q+nS} = \frac{\frac{m}{\theta}SQ}{Q+\frac{n}{\theta}S}$. This is the value of q in the given caſe, where the lines O Q, O S, O q lie all on the ſame ſide of the ſurface O I; and thence the theorem for q may be eaſily adapted to any other given caſe, by conſidering O Q as being always affirmative, and by changing the ſign of S when O S and O Q lie on contrary ſides of their origin O; and by changing the ſign of θ, when the ſign of incidence is leſs than the ſine of refraction; and, laſtly, by placing O q the contrary way to O Q, when the value of q comes out negative by the theorem ſo changed.

Theorem for reflected rays. Subſtitute $-m$ in the preceding theorem for n, and conſequently $2m$ for θ, and we have $q = \frac{\frac{1}{2}SQ}{Q-\frac{1}{2}S}$; which theorem gives the focus of rays reflected from the ſpherical ſurface O I. For the calculation continues the ſame, whether the rays go forwards or backwards in the line I q; and to change the angle of refraction S I q (*ibid.* n° 3.) into an angle of reflection, it and its ſine n muſt be diminiſhed to nothing, and then become negative and equal to $-m$, the ſine of the angle of incidence S I Q (*ibid.* n° 4.)

Having the Focus *of rays falling almoſt perpendicularly upon a given lens, to find their focus after refractions.* Let O I E o (*ibid.* n° 5.) be the given lens, whoſe vertex's are O and o; R the center of the firſt ſurface O I; r the center of the ſecond o E; P the given focus of incident rays in the axis o O r R; and p the focus of the emergent rays required. Let ϖ be their focus after the firſt refraction at the ſurface O I, and m to n the ratio of the ſines as above, and call O o, O r, O R, O P, $o\,p$, reſpectively o, r, R, P, p. Then for Q, S, m, n, θ in the foregoing theorem, write P, R, m, n, θ; and we have $O\varpi = \frac{mPR}{\theta P+nR}$; to which adding O o, or o, we have $o\,\varpi$ or $\varpi = \frac{mPR+\theta Po+nRo}{\theta P+nR}$. Again, for Q, S, m, n, θ in the foregoing theorem, write $\varpi, r, n, m, -\theta$; and we have $p = \frac{nr\varpi}{-\theta\varpi+mr}$; in which by ſubſtituting the value of ϖ, we have $p = \frac{mnPRr+n\theta Pro+nnRro}{m\theta Pr-m\theta PR+mnRr-\theta\theta Po-n\theta Ro}$: This theorem for a miniſcus lens, having its concave ſurface expoſed to P, is eaſily adapted to a lens of any given form, by conceiving one or both its ſemi-diameters O R, $o\,r$, to decreaſe or increaſe, or to become infinite and then negative, till the miniſcus acquires the form of the given lens; and by changing the ſign of R or r, when the ſemi-diameters lie on oppoſite ſides of their ſurfaces O, o, to the focus P; and, laſtly, by placing p on the oppoſite ſide of o to P, when its value in the theorem ſo changed comes out negative. Thus by writing ∞ (which denotes infinite) for R, this theorem is eaſily adapted to a plano-convex lens, having its firſt ſurface plane; and by writing $-R$ for R, it is adapted to a double convex lens; and by writing $-R$ for R, and ∞ for r, it is adapted to a plano convex lens whoſe firſt ſurface is convex; and by writing $-R$ for R, and $-r$ for r, and $o+r$ for R, it is adapted to a lens of concentric ſurfaces, whoſe firſt ſurface is convex; and by writing $R+o$ for r, it is adapted to a lens of concentric ſurfaces whoſe firſt ſurface is concave; and by writing ∞ for r, it is adapted to a plano-concave lens, whoſe firſt ſurface is concave; and by writing $-r$ for r, it is adapted to a double concave; and by writing ∞ for R, and $-r$ for r, it is adapted to a plano-concave whoſe firſt ſurface is plane; and, laſtly, it is adapted to a ſphere whoſe ſemi-diameter is R and diameter O o, by writing $-R$ for R, and R for r, and 2 R for o; and by ſubſtituting given numbers for the ratio of refraction, the bigger for m, and the leſſer for n, it is adapted to lens's of any given ſubſtances.

Before the diſcovery of the law of refraction, according to the given ratio of the ſines of incidence and refraction of any given magnitudes, opticians could only conſider the refractions of ſuch rays as fell ſell almoſt perpendicularly upon the refracting ſurfaces, where the angles of incidence and refraction being but ſmall, were known by experience to be nearly in a given ratio to each other, and theſe rays they found would all belong to one focus pretty nearly. But Dr. Barrow obſerving that the ſeveral ſmall portions of a large pencil of rays flowing from a given focus, would diverge after refraction or reflection from ſeveral different foci, according as they fell with different obliquities upon the ſeveral parts of a ſpherical ſurface, and being of opinion that the eye receiving a certain ſmall portion of theſe rays, would judge the object to appear in the place from which they diverged, and conſequently to appear in different places according as the eye received a different portion, took occaſion from thence to determine theſe places geometrically by means of the law of refraction, then newly diſcovered; and conſequently to handle the ſubject of dioptrics and catoptrics, in a more extenſive manner than any writer had then done. The foci of rays obliquely refracted and reflected, have alſo been touched upon by Sir Iſaac Newton in his optical lectures, in order to determine the diameters and breadths of the rainbows, and to make way for his admirable theorems concerning the ſeparations of heterogeneal rays. The reader, therefore, deſirous of being fully inſtructed in the determinations of the foci of rays falling with any degrees of obliquity upon any number of reflecting and refracting ſurfaces of any ſort, may conſult the above-mentioned writers, as alſo Dr. Smith's optics, book 2. chap 9. and the remarks on that chapter, where the chief diſcoveries of Sir Iſaac and Dr. Barrow are not only comprehended, but made much more general, by ſhewing that the relation of the focus's of incident and emergent rays, to the focus's of parallel rays coming contrary ways is always the ſame, after any number of oblique refractions or reflections, as when a pencil of rays is but once refracted or reflected at the vertex of a ſingle ſurface.

FODDER, any kind of meat for horſes, or other cattle. In ſome places, hay and ſtraw, mingled together, is peculiarly denominated fodder.

FODDER, in the civil law, is uſed for a prerogative that the prince has, to be provided of corn and other meats for his horſes, by the ſubjects, in his warlike expeditions.

FODDER, in mining, a meaſure containing twenty-two hundred and an half weight, though in London but twenty hundred weight.

FODINA, in anatomy, the labyrinth of the ear. See the article EAR.

FOECES and **FOECULA**. See the articles FÆCES and FÆCULA.

FOECIALES, or **FECIALES**, in roman antiquity. See the article FECIALES.

FOECUNDITY, or **FECUNDITY**, the ſame with fertility. See FERTILITY.

FOENICULUM, *fennel*, in botany, a ſpecies of anethum or dill. See the articles DILL and FENNEL.

FOENUGREEK, *fœnum græcum*, in botany, is called by Linnæus trigonella. See the article TRIGONELLA.

The figure of fœnugreek-ſeed is ſingular, being irregularly rhomboidal, conſiderably thick, with a line or depreſſion running obliquely from one of the oppoſite angles to the other. It is of a pale-yellowiſh colour, and of an extremely tough and firm texture. It is of a ſtrong and agreeable ſmell, and of a faint nauſeous taſte. We have it from Germany.

Fœnugreek is uſed externally on many occaſions by way of cataplaſm or fomentation; being emollient and diſcutient in a great degree, and found to give great relief in pains, bruiſes, &c. It is ſometimes alſo an ingredient in emollient clyſters, where anodynes and carminatives are required, without too much pungency. It is alſo an ingredient in the ointment of marſh-mallows, and ſome other ſhop-compoſitions; but is never given internally.

FOETOR, in medicine, ſtinking or fœtid effluvia, ariſing from the body, or any part thereof.

FOETOR NARIUM, a fœtid ſtench of the noſtrils, ariſing from a deep ulcer within the noſe, the cauſe of which, according to Galen, is a ſharp humour falling from the brain upon the mamillary proceſſes. See the article ULCER.

This is one of the cauſes for which marriage might, in former times, be annulled.

FOETOR ORIS, a term uſed by medical writers to expreſs that bad ſmell in the mouth, uſually, though often improperly, called a ſtinking breath.

This is a malady ariſing in different caſes from very different cauſes, as from the ſcurvy, and particularly from that ſpecies of it which affects the mouth, and is therefore called ſtomocace; from the french pox; from an ulceration, whether ſimple or fiſtulous, in the lungs, which is the caſe in conſumptions; from ulcers in the mouth; from a caries or rottenneſs of the teeth, or from any other impurity of them; from crudities in the ſtomach, ariſing from a bad digeſtion; and particularly from a weakneſs about the left orifice of the ſtomach, from which part the fœtid vapour will often ariſe in very great abundance.

According to the different cauſes of this diſorder, it requires a very different method of cure; in caſes where it depends on the ſcurvy, pox, or other diſeaſes, then thoſe diſeaſes are to be attacked by the proper medicines. See SCURVY, POX, *&c.*

When it ariſes from a carious tooth, there is no other cure for it but drawing the tooth. When the impurities of the teeth occaſion it, the cleaning them proves a cure.

FOETUS, in phyſiology, denotes the child while it is contained in the mother's womb, but particularly after it is formed, till which time it is more properly called embryo. See the article GENERATION.

Formation of a FOETUS. The formation of the bones in a fœtus, is very gradual and regularly performed. In the firſt two months, there is nothing of a bony nature in the whole. After this, the hardneſs of the parts, where the principal bones are to be ſituated, becomes, by degrees, perceptible. Dr. Keikring deſcribes the progreſs of the oſſification from ſkeletons, which he had prepared from fœtuſes of two months, and thence up to nine. In the firſt two months, or to the end of that time, there appears not any thing bony. After this, in the third and fourth months, the ſeveral parts, one after another, acquire their bony nature. In the firſt ſtages, every thing is membranous, where the bones are to be: theſe, by degrees, tranſmigrate into cartilages, and from theſe, by the ſame ſort of change continued, the bones themſelves are by degrees formed. All this is done by nature, by ſuch ſlow, though ſuch certain progreſſions, that the niceſt eye can never ſee it doing, though it eaſily ſees it when done.

Fœtuſes increaſe proportionably leſs, the longer they continue in the womb. Mauriceau pretends, that the increaſe of a fœtus is ſixty-four times its own weight in triple the time. Thus, he ſays, that, at the birth, a child weighs twelve pounds, of ſixteen ounces each; at the three months, it weighs three ounces; at one month, $\frac{3}{8}$ of a drachm; and at ten days, leſs than half a grain.

Anatomy of a FOETUS. In the examination of the fœtus intire, we firſt obſerve the membranes ſurrounding it in the uterus, as in an egg; the exterior of theſe is the chorion; the interior, or ſecond membrane, is the amnios; and a third, tho' its exiſtence is diſputed in human ſubjects, is the allantois. See the articles CHORION, AMNIOS, and ALLANTOIS.

After the membranes including the fœtus, we are next to examine the placenta, the number of which, in human ſubjects, anſwers to that of the fœtuſes. See the article PLACENTA.

After the placenta, we are to obſerve the umbilical veſſels of the fœtus, which, after the birth, degenerate into ligaments. See UMBILICAL and ARTERY.

Another part belonging to the umbilical veſſels obſervable in the human fœtus, is the funiculus umbilicalis, or navel-ſtring. See the article NAVEL.

The more eſſential differences between the human fœtus and an adult, conſidering the fœtus not only as yet encloſed within the womb, but as newly come from it, are as follows.

In the abdomen, the umbilical vein and arteries of the navel, and the canalis venoſus in the liver, are in the fœtus open and pervious; in adults, they are contracted and ſolid. The liver is very large, the ſtomach is filled with a glutinous fluid, and the larger inteſtines, and often the ilium alſo, with the fæces called meconium. The renes ſuccenturiati, are larger in the fœtus than in adults. The kidneys themſelves are not ſmooth and even on the ſurface, as in adults, but unequal, and in ſome meaſure reſemble thoſe of a calf. The urinary bladder is of a longer ſhape, and extends almoſt to the navel. The hymen in a female fœtus, is very plain and obvious. In the thorax, beſides a peculiar fluid, found as well in this cavity as in the abdomen, the gland thymus is larger than it is in adults. The lungs, as they have never yet been inflated by breathing, are collapſed, and of a blackiſh colour; and if thrown into water they ſink in it, contrary to what is the caſe in thoſe in adults. In the heart, the foramen ovale between the left and right auricle, and the canalis arterioſus, between the pulmonary artery and the aorta, are open, to ſerve for a peculiar circulation in the fœtus, which has not yet breathed; and there is in the inferior trunk of the vena cava, near the heart, a remarkable valve, called by Cheſelden in his anatomy, valvula nobilis. See the article VALVE.

In the head, beſides its great ſize in proportion to the body, we are to obſerve, that the oſſa cranii are in ſeveral places diſtant from one another, eſpecially at the fontanella; and that the ſutures are wanting. The brain alſo is ſofter than in adults. The teeth are alſo imperfect, and not rooted in the gums; they lie hid or buried under the gums, to appear at a more advanced period. The meatus auditorius is not yet perfect in them; and in the fœtus, whilſt it is in the womb, is entirely cloſed up by a peculiar membrane, which is continuous with the epidermis, and which naturally diſappears after delivery. The bones of the whole body, excepting only a very few, are either ſoft or yet abſolutely imperfect: ſome of them are merely cartilaginous, and the articulations are not at that time perfected.

Situation of the FOETUS *in the womb.* This, in the firſt months, and even in the middle ones, is perfectly uncertain; but in the latter months, it is more regular; in theſe it is uſually in a poſture like that of ſitting, and its head and neck are bent downwards; its knees are raiſed up towards its cheeks; and its heels drawn up to its buttocks. Its hands are uſually hanging down, and embrace the feet. A little time before the delivery, it uſually changes its poſition, in ſuch a manner, that its head falls towards the mouth of the womb, and its buttocks and feet are turned upwards. Frequently, however, it varies during the whole time of the pregnancy from the common rule, and at the very inſtant of the delivery, its head does not preſent itſelf, but is turned to one ſide, or to ſome other part of the womb.

For the excluſion of the fœtus from the uterus, ſee the article DELIVERY.

Nutrition of the FOETUS. How the nutrition of the fœtus is performed, is diſputed among the learned. Heiſter is of opinion, that the nutrition of the fœtus, during the firſt months, while the organs of concoction are not yet formed, is probably effected by means of the navel-ſtring alone. But in the more advanced ſtate of the fœtus, in the latter months, that great anatomiſt ſuppoſes, that it is alſo nouriſhed by the mouth, by means of a ſoft and ſomewhat glutinous fluid that ſurrounds it, and which is probably ſecreted from the amnios. In ſupport of this opinion he obſerves, 1. That a fluid ſimilar to that of the amnios, is found in the mouth, the œſophagus, and the ſtomach, not only of the human fœtus, but in that of quadrupeds. 2. That this fluid is alſo found in the ſmall guts of the fœtus, but altered and digeſted. 3. That there are alſo found in the larger inteſtines real fæces, called meconium: ſometimes the whole ilium is full of theſe. 4. That in the firſt months, there is a great quantity of this fluid ſurrounding the fœtus: but in the latter months, there is but very little of it, and the conſumption of it is not eaſily accounted for any other way, than by its being ſwallowed by the fœtus. 5. That the liquid itſelf is ſo extremely proper for the nutrition of the fœtus, that a more fit one could not have been formed or deſired. 6. That it ſeems to be continually preſſed into the mouth, œſophagus, and ſtomach of the fœtus, by the perpetual renitency of the uterus itſelf, and by the preſſure of the muſcles of the abdomen, and of the ambient air.

Mr. Gibſon, in the Medical Eſſays of Edinburgh, has lately adopted this opinion as the moſt probable. Hippocrates, among the antients, was of opinion, that the fœtus was nouriſhed both by the mouth and by the umbilical veſſels. He maintains, that the child, in the womb, with its lips compreſſed together, attracts nouriſhment; for which he aſſigns this reaſon, that, unleſs the child had ſucked in utero, it neither could depoſit excrement, nor know how to ſuck ſo ſoon as it was born.

On the other hand, Dr. Monro, of Edinburgh, is of opinion, that the fœtus in viviparous animals, is nouriſhed by the navel alone. He has given a curious diſſertation on this ſubject in the Medical Eſſays, where he obſerves, 1. That the fœtus is capable of receiving its whole nouriſhment by the umbilical vein alone, whereas no fœtus can ſubſiſt without the umbilical veſſels. 2. That the liquor of the amnios is ill calculated in its natural ſtate for the food of a fœtus, and becomes altogether unfit food in morbid caſes. 3. That it is highly improbable, that a creature ſhould furniſh its ſubſiſtence out of its own body, which muſt be the caſe, if the fœtus feeds on the liquor of the amnios,

amnios. 4. That it cannot be inferred from any reſemblance of the liquor of the ſtomach and amnios, nor from any other appearances, that the liquor of the amnios is ever ſent down into the ſtomach. 5. That no direct proof can be had of the liquor of the amnios being preſſed or ſwallowed down, but, on the contrary, all circumſtances make it probable, that it does not go down. 6. That all the phænomena of a fœtus can moſt reaſonably be accounted for, without ſuppoſing the liquor of the amnios to be any part of its food: hence he thinks it reaſonable to exclude the mouth from the office of conveying the aliment of the fœtuſes of viviparous animals, and to believe that all their nouriſhment is conveyed by the veſſels. See Medical Eſſays, vol. II. page 102, *ſeq.*

Dr. Monro has, in theſe eſſays, given ſeveral other curious obſervations relating to the queſtion about the nutrition of fœtuſes of viviparous animals: he has alſo conſidered the nouriſhment of plants in a fœtus-ſtate, and ſhewn the analogy there is between theſe and the animal fœtuſes. To fix the analogy between animals and plants, he obſerves that the former may be ſaid to remain in the ſtate of a fœtus, ſo long as the young creature is ſolely nouriſhed by liquors furniſhed by the uterus of the parent; and plants are to be conſidered as fœtuſes only, while the ſeed is ripening, and before the earth, water, moiſture of the air, *&c.* have communicated immediately any matter for its increaſe. Medical Eſſays, vol. II. page 201. *ſeq.*

To the queſtion, Whence fœtuſes have their red blood? Dr. Monro anſwers, that fœtuſes in viviparous animals, have their red blood from the ſame ſource that chickens in the egg have theirs, which can be no other than the action of their heart, and of the veſſels in their body and ſecundines.

While fœtuſes continue in the womb, their muſcles commonly act by their natural contraction, or the fœtus is ſaid to be in a ſtate of ſleeping: but ſometimes, when its eaſe or preſervation requires a change of ſituation, it ſeems to perform ſome voluntary motions which are called ſtirrings. The human fœtus is generally ſuppoſed to be animated about the end of the ſixth, or beginning of the ſeventh week after conception; though it is ſeldom felt to ſtir, till towards the middle of the time of geſtation.

Reſpiration ſeems to be the great act by which the change is made in animals, from the ſtate of fœtus, to that of motion, ſenſation, and the other qualities of animal life in their larger degree. Mr. Duverney obſerved this in the fœtus of a common ſnake: he broke the egg of one of theſe animals, at a time when it was juſt ready for hatching, and the young ſnake fell out, rolled in a ſpiral, at firſt quite ſtiff and motionleſs; but it had no ſooner breathed three or four times, than it began to perform all the motions of animal life, in the moſt nimble and active manner. See the article RESPIRATION.

Hippocrates and ſome learned modern phyſicians ſuppoſe, that a fœtus reſpires in the womb; but it ſeems very difficult to conceive how air ſhould traverſe the body of the mother, and the teguments of the child; and ſince nature hath in new-born infants contrived peculiar temporary veſſels, that the blood may circulate through other paſſages than it does in the ſame individuals, when they come to have the free uſe of their lungs, it is improbable that the fœtus in the womb ſhould properly reſpire.

The ſymptoms of the human fœtus being dead in the womb, the reaſons which may occaſion it, the accidents which attend it, and the methods of preventing it, and remedying the conſequences thereof, as alſo the various ways of expelling it, may be ſeen under the articles ABORTION, CONCEPTION, DELIVERY, *&c.*

For the circulation of the blood, as performed in the fœtus, ſee CIRCULATION.

FOG, or MIST, a meteor conſiſting of groſs vapours, floating near the ſurface of the earth.

Miſts, according to lord Bacon, are imperfect condenſations of the air, conſiſting of a large proportion of the air, and a ſmall one of the aqueous vapour; and theſe happen in the winter, about the change of the weather, from froſt to thaw, or from thaw to froſt: but in the ſummer and the ſpring, from the expanſion of the dew.

If the vapours, which are raiſed plentifully from the earth and waters, either by the ſolar or ſubterraneous heat, do, at their firſt entrance into the atmoſphere, meet with cold enough to condenſe them to a conſiderable degree, their ſpecific gravity is, by that means, encreaſed; and ſo they will be ſtopped from aſcending, and return back, either in form of dew, or drizzling rain; or remain ſuſpended ſome time in the form of a fog. Vapours may be ſeen on the high grounds as well as the low, but more eſpecially about marſhy places: they are eaſily diſſipated by the wind, as alſo by the heat of the ſun: they continue longeſt in the loweſt grounds, becauſe theſe places contain moſt moiſture, and are leaſt expoſed to the action of the wind.

Hence we may eaſily conceive, that fogs are only low clouds, or clouds in the loweſt region of the air; as clouds are no other than fogs, raiſed on high. See CLOUD. When fogs ſtink, then the vapours are mixt with ſulphureous exhalations, which ſmell ſo. Objects viewed through fogs, appear larger and more remote than through the common air. Mr. Boyle obſerves, that upon the coaſt of Coromandel, and the moſt maritime parts of the Eaſt Indies, there are, notwithſtanding the heat of the climate, annual fogs ſo thick, as to occaſion thoſe of other nations who reſide there, and even the more tender part of the natives, to keep their houſes cloſe ſhut up.

FOGAGE, in the foreſt law, is rank graſs not eaten up in ſummer.

FOGARES, a town of Tranſilvania, thirty miles north-eaſt of Hermanſtat.

FOGO, one of the Cape-Verd iſlands, ſubject to Portugal.

FOIL, among glaſs-grinders, a ſheet of tin, with quickſilver or the like, laid on the backſide of a looking-glaſs, to make it reflect. See the articles FOLIATING and GLASS.

FOIL, among jewellers, a thin leaf of metal placed under a precious ſtone, in order to make it look tranſparent, and give it an agreeable different colour, either deep or pale: thus, if you want a ſtone to be of a pale colour, put a foil of that colour under it; or if you would have it deep, lay a dark one under it.

Theſe foils are made either of copper, gold, or gold and ſilver together: the copper foils are commonly known by the name of nuremberg or german foils; they are prepared as follows: procure the thinneſt copper-plates you can get; beat theſe plates gently upon a well-poliſhed anvil, with a poliſhed hammer, as thin as poſſible; and placing them between two iron-plates as thin as writing-paper, heat them in the fire; then boil the foils, in a pipkin, with equal quantities of tartar and ſalt, conſtantly ſtirring them till by boiling they become white; after which, taking them out, and drying them, give them another hammering, till they are made fit for your purpoſe: however, care muſt be taken not to give the foils too much heat, for fear of melting, nor muſt they be too long boiled, for fear of attracting too much ſalt.

The manner of poliſhing theſe foils is as follows: take a plate of the beſt copper, one foot long and about five or ſix inches wide, poliſhed to the greateſt perfection; bend this to a long convex, faſten it upon a half roll, and fix it to a bench or table; then take ſome chalk, waſhed as clean as poſſible, and filtred through a fine linen-cloth, till it be as fine as you can make it; and having laid ſome thereof on the roll, and wetted the copper all over, lay your foils upon it, and with a poliſhing ſtone and the chalk, poliſh your foils till they are as bright as a looking-glaſs; after which they muſt be dried, and laid up ſecure from duſt.

FOILING, among huntſmen, the footing and treading of a deer, that is on the graſs and ſcarce viſible.

FOLCLAND and FOLCMOTE. See the articles FOLKLAND and FOLKMOTE.

FOLD-NET, among ſportſmen, a ſort of net with which ſmall birds are taken in the night, of which there are two ſorts; the leaſt may be managed by one man only, but the greateſt muſt be carried by two, and uſed thus: let the net be fixed on both ſides, to two ſtrong, ſtraight, and light poles about twelve feet long, each man holding one of them; let there be one behind them, at the diſtance of two yards, to carry lights: the nets muſt be carried between the wind and the birds, which all naturally rooſt on their perches with their breaſts againſt the wind; by reaſon of this, he that beats the buſhes on the other ſide of the hedge, will drive them out that way towards the light.

FOLDAGE, the liberty of penning ſheep by night. See the article FALDAGE.

FOLDING *of ſheep*. In ſome places they ſet their fold with ſeveral partitions, and put the wedders, ewes, and lambs ſeparate by themſelves. It is not good to fold them in rainy weather: and, as it is the opinion of ſome huſbandmen that urine of ſheep heats, helps and comforts the land as much or rather more than their dung does, they cauſe all the ſheep in the fold to be raiſed before they let them go out, and go about the ſides of the fold with a dog; for commonly when ſheep ſee a dog come nigh them, they will dung and ſtale.

FOLIA, among botaniſts, particularly ſignify the leaves of plants; thoſe of flowers being expreſſed by the word petal. See the article PETAL.

FOLIACEUM EXPANSUM, in anatomy, a term applied to the extreme part of the fallopian tube, next the ovary, which is expanded like the mouth of a trumpet, and ſurrounded with a ſort of fringe. See the article FALLOPIAN TUBE.

FOLIAGE, a cluſter or aſſemblage of flowers, leaves, branches, &c.

FOLIAGE is particularly uſed for the repreſentations of ſuch flowers, leaves, branches, rinds, &c. whether natural or artificial, as are uſed for enrichments on capitals, friezes, pediments, &c.

FOLIATE, in the higher geometry, a name given by Mr. de Moivre to a curve of the ſecond order, expreſſed by the equation $x^3+y^3=axy$; being a ſpecies of defective hyperbolas with one aſymptote, and conſiſting of two infinite legs croſſing one another, and forming a ſort of leaf.

FOLIATING *of looking-glaſſes*, the ſpreading the plates over, after they are poliſhed, with quickſilver, &c. in order to reflect the image. It is performed thus: a thin blotting paper is ſpread on the table, and ſprinkled with fine chalk; and then a fine lamina or leaf of tin, called foil, is laid over the paper; upon this mercury is poured, which is to be diſtributed equally over the leaf with a hare's foot, or cotton: over this is laid a clean paper, and over that the glaſs-plate, which is preſſed down with the right-hand, and the paper drawn gently out with the left: this being done, the plate is covered with a thicker paper, and loaden with a greater weight, that the ſuperfluous mercury may be driven out, and the tin adhere more cloſely to the glaſs. When it is dried, the weight is removed, and the looking-glaſs is complete.

Some add an ounce of marcaſite, melted by the fire; and, leſt the mercury ſhould evaporate in ſmoke, pour it into cold water; and when cooled, ſqueeze through a cloth, or through leather.

Some add a quarter of an ounce of tin and lead to the marcaſite, that the glaſs may dry the ſooner.

Foliating of globe looking-glaſſes, is done as follows: take five ounces of quickſilver, and one ounce of biſmuth; of lead and tin, half an ounce each: firſt put the lead and tin into fuſion, then put in the biſmuth, and when you perceive that in fuſion too, let it ſtand till it is almoſt cold, and pour the quickſilver into it: after this, take the glaſs globe, which muſt be very clean, and the inſide free from duſt; make a paper-funnel, which put into the hole of the globe, as near to the glaſs as you can, ſo that the amalgam, when you pour it in, may not ſplaſh, and cauſe the glaſs to be full of ſpots; pour it in gently, and move it about, ſo that the amalgam may touch every where. If you find the amalgam begin to be curdly and fixed, then hold it over a gentle fire, and it will eaſily flow again. And if you find the amalgam too thin, add a little more lead, tin, and biſmuth to it. The finer and clearer your globe is, the better will the looking-glaſs be.

Dr. Shaw obſerves, that this operation has conſiderable advantages, as being performable in the cold, and that it is not attended with the danger of poiſonous fumes from arſenic, or other unwholſome matters, uſually employed for this purpoſe: beſides, how far it is applicable to the more commodious foliating of the common looking-glaſſes, and other ſpeculums, he thinks, may deſerve to be conſidered.

FOLIATION, a term uſed by ſome botaniſts to denote the corolla, or flower-leaves. See FLOWER and COROLLA.

FOLIO, in merchants books, denotes a page, or rather both the right and left hand pages, theſe being expreſſed by the ſame figure, and correſponding to each other. See BOOK.

FOLIO, among printers and bookſellers, the largeſt form of books, when each ſheet is ſo printed, that it may be bound up in two leaves only.

This form is only uſed in large works; but the quarto or octavo forms are much more handy.

FOLIUM, LEAF, among botaniſts. See the article LEAF.

FOLIUM INDICUM, INDIAN LEAF, in the materia medica, is an oblong, ſmooth, and pointed leaf, of a grateful ſmell. They agree in virtues with ſpikenard, and are to be choſen freſh and greeniſh. They are the produce of a ſort of cinnamon. See the article CINNAMON.

FOLIUM BRANCHIARUM, among ichthyologiſts, the leaf of the gills. See GILLS.

FOLKLAND, in antient law-writers, the ſame with copyhold. See COPYHOLD.

FOLKMOTE, or FOLCMOTE, according to Kennet, was the common-council of all the inhabitants of a city, town, or borough: though Spelman will have the folkmote to have been a ſort of annual parliament or convention of the biſhops, thanes, aldermen, and freemen on every May-day. Dr. Brady, on the contrary, tells us, that it was an inferior court, held before the king's reeve, or his ſteward, every month, to do folk right.

FOLKSTONE, a market town of Kent, ſix miles weſt of Dover.

FOLLICLE, *folliculus*, among botaniſts, denotes a kind of ſeed-veſſel, like the conceptaculum. See CONCEPTACULUM.

FOLLICULUS FELLIS, the GALL-BLADDER. See the article GALL-BLADDER.

FOMAHANT, in aſtronomy, a ſtar of the firſt magnitude, in the conſtellation aquarius. See the article AQUARIUS.

FOMENTATION, in medicine, the bathing any part of the body with a convenient liquor; which is uſually a decoction of herbs, water, wine, or milk; and the applying of bags ſtuffed with herbs and other ingredients, which is commonly called dry fomentation.

Fomentations differ in little elſe from embrocations, but that they are moſtly made with aqueous menſtruums, are more extenſive in their manner of application, and are aſſiſted by actual heat, and hot woollen cloths: add to this, that fomentations, when general, or applied to every part of the body, are called baths. See the article BATH and EMBROCATION.

According to ſome, a fomentation is only a liquid epithem, applied hot. See the article EPITHEM.

Fomentations are to be looked on as partial bathings, applied only to a diſeaſed part, on which they have much the ſame effect as bathing has on the whole body. See the article BATHING.

FONCEAU, in the manege, the ſame with chaperon. See CHAPERON.

FONDI, a city and biſhop's ſee of Naples, in the province of Lavoro, about thirty-five miles north-weſt of Capua: eaſt long. 14° 20′, and north lat. 41° 35′.

FONT, among eccleſiaſtical writers, a large baſon, in which water is kept for the baptizing of infants, or other perſons.

It is ſo called probably becauſe baptiſm was uſually performed among the primitive chriſtians at ſprings or fountains. In proceſs of time the font came to be uſed, being placed at the lower end of the church, to intimate, perhaps, that baptiſm is the rite of admiſſion into the chriſtian church.

By the canons of the church of England, every church is to have a font made of ſtone; becauſe, ſays Durandus, the water which typified baptiſm in the wilderneſs, flowed from a rock; or rather, becauſe Chriſt is in ſcripture called the corner-ſtone, and the rock. See BAPTISM.

FONT, or **FOUNT**, among printers. See the article FOUNT.

FONTAINE, a town of Hainalt, fifteen miles eaſt of Mons.

FONTAINEBLEAU, a village of the iſle of France, about thirty miles ſouth-eaſt of Paris; remarkable for an elegant royal palace.

FONTANELLA, in anatomy, the quadrangular aperture, between the os frontis and oſſa ſincipitis, in infants juſt born, which is alſo called fons pulſatilis.

FONTANELLA, in ſurgery, the ſame with fonticulus. See FONTICULUS.

FONTARABIA, a port-town of Spain, in the province of Biſcay, twenty miles weſt of Bayonne: weſt lon. 1° 35′, and north lat. 43° 20′.

FONTENAYLE, a town of Orleanois, in France, about forty-ſix miles weſt of Poictiers.

FONTENOY, a town of Hainalt, ſituated three miles ſouth-eaſt of Tournay.

FONTEVRAUD, or *Order of* FONTEVRAUD, a religious order inſtituted about the latter end of the XIth century. By the rules of this order the nuns were to keep ſilence for ever, and their faces to be always covered with their veils; and the monks wore a leathern girdle, at which hung a knife and ſheath.

FONTICULUS, or FONTANELLA, in ſurgery, an iſſue, ſeton, or ſmall ulcer made in various parts of the body, in order to eliminate the latent corruption out of it. See ISSUE, SETON, &c.

FONTINALIA, in roman antiquity, a religious feaſt celebrated on October 13, in honour of the nymphs of wells and fountains. The ceremony conſiſted in throwing noſegays into the fountains, and putting crowns of flowers upon the wells. Scaliger, however, in his conjectures upon Varro, takes this not to have been a feaſt in honour of fountains in general, but of the fountain which had a temple at Rome, near the Porta Capena, called from thence Porta Fontinalis.

FONTINALIS, in botany, a genus of the cryptogamia claſs of moſſes; the male flower is almoſt ſeſſile in the alæ of the leaves; the anthera is roundiſh, with an open mouth, and covered with calyptræ.

FOOD implies whatever aliments are taken into the body, to nouriſh it. See **DIET**, **DRINK**, **ALIMENT**, *&c.*

As the health of the human body evidently depends upon the quantity and quality of the blood and juices, it is plain that all thoſe aliments which preſerve and maintain a juſt temperament and a due quantity of theſe are beneficial to health; and that ſuch as have a contrary tendency are to be reckoned unwholeſome. As to the nature of food with reſpect to mankind in general, ſome is of a good juice, and ſome of a bad juice; the firſt generates pure blood; the other bile, or an atrabilious humour. Moreover, ſome ſorts of food are eaſy of concoction, others difficult: ſome looſen the belly, others bind it: and every ſort is ſaid to be endued with ſome peculiar virtue or property, the reaſons of which are founded in nature.

As the blood, the nutritive juice, and in general all the parts of the body are made up of three elements, *viz.* of one which is ſulphureous, oily, and inflammable; of one of an earthy, ſubtile, alkaline nature; and of one of an aqueous nature: ſo the ſeveral kinds and virtues of food may be moſt commodiouſly reduced to theſe three claſſes; and aliments of theſe three ſeveral qualities, duly mixed with one another, afford a proper nouriſhment for the human body.

The fleſh of animals, eſpecially when roaſted, affords the body its principal ſupply of the ſulphureous part; but it is to be obſerved, that wild animals are preferable in this reſpect to the tame and domeſtic kind, becauſe their oils and ſalts are exalted by habitual exerciſe. Among the aliments which furniſh the blood with its humid parts, of animals, fiſh; and of vegetables, pot-herbs, the milder roots, and ſome ſummer-fruits are reckoned the principal. To the third claſs, which ſupplies the blood with its fixed and earthy parts, belong all kinds of grains, as the ſeveral ſorts of bread, rice, peas, beans, lentils, cheſnuts, almonds, cacao, cheeſe, *&c.* From what has been ſaid, it will appear that all ſuch aliments as are of a mild quality, and reſemble the chyle and blood, are fit for nouriſhment; that all ſuch food as either recedes from, or is quite oppoſite to the nature of the chyle and blood, is unfit for nouriſhing the parts; that all food in which there is too much of an acid, is improper for nouriſhment, becauſe milk and blood will not mix with an acid, which is quite oppoſite to their natures, and induces a coagulation of the circulating juices; that all ſalts, and all foods too highly ſalted, muſt be unfit for nouriſhment, becauſe no ſalt whatever can be mixed with the blood, chyle, and milk; and laſtly, that the free uſe of ſpirits muſt be very detrimental both to health and nouriſhment, becauſe blood and chyle never incorporate with ſpirituous liquors, but rather ſeparate from them.

Foods proper for preſerving health ought not only to contain a laudable juice, but ſhould likewiſe be eaſily diſſolved by the ſtomach: hence it is plain, that all thoſe kinds of food, which on account of the cloſeneſs and compactneſs of their texture, are with difficulty diſſolved, are for that very reaſon leſs conducive to health. Again, as it is neceſſary to the performance of the office of nutrition, that the ſmall mouths of the internal rough coat of the inteſtines abſorb the chyle, and convey it to the blood, none of thoſe foods which either obſtruct or too much corrugate its mouths, can be uſed, without in ſome meaſure injuring health. And as the effete maſs of foods, drained and exhauſted by the ſeparation of the chyle from it, ought by the expanſive and contractive motion of the inteſtines, to be thrown off from them; it muſt of courſe follow, that all thoſe foods are prejudicial to health, which either paſs through the inteſtines with difficulty, ſtop their motions, or weaken their tone and impair their ſtrength by ſuppreſſing excretion, ſo neceſſary to health. This characteriſtic of unwholeſomeneſs belongs to all aſtringent, mouldy, glutinous, viſcid, auſtere foods, to all unripe ſummer-fruits, and in general to all ſuch aliments as are eaſily reducible to a firm coagulum, which, by adhering immoveably to the coats of the inteſtines, and incruſtating the orifices of their ſmall abſorbent veſſels, occaſion copious flatulencies and ſpaſms. The unwholeſomeneſs of food is alſo to be eſtimated from their impairing the fermentative and ſolutive powers of the ſtomach, ſince by that means crudities are generated. Upon the whole, however, it muſt be obſerved, that for different intentions, different kinds of foods are required; in which age, conſtitution, climate, ſeaſon of the year, and numberleſs other conſiderations are to be included; and that abſtinence and exerciſe muſt conduce with every kind of food, for the preſervation of health; and that where exerciſe is wanting, as in ſtudious perſons, the defect muſt be ſupplied with abſtinence.

The quantity of food alſo muſt vary according to age, ſeaſon, conſtitution, and nature of the food itſelf. Some phyſicians ſay, that in winter, where the perſpiration of an unexerciſed perſon is only equal to the urine, the food for twenty-four hours ought not to exceed four pounds, or four pounds and a half. In ſummer, the food may be ſix pounds and an half, which may be carried off without the help of exerciſe, when the air is hot and dry. Dr. Bryan Robinſon thinks, that if the quantity of food be ſuch as to make the perſpiration and urine of a natural day always nearly equal, and the morning-weight of the body always nearly the ſame, that quantity is the truly healthful quantity of food for grown perſons who uſe but little exerciſe. The ſame author thinks, that the quantity of food neceſſary to keep a grown body in health, will be better and more eaſily digeſted, when it is ſo divided as to make the meals equal, than when they are very unequal: that good and conſtant health conſiſts in a juſt quantity of food, and a juſt proportion of the meat to the drink: and that to be freed from chronical diſorders contracted by intemperance, the quantity of food ought to be leſſened, and the proportion of the meat to the drink increaſed more or leſs, according to the greatneſs of the diſorders.

FOOL, according to Mr. Locke, is a perſon who makes falſe concluſions from right principles; whereas a madman, on the contrary, draws right concluſions from wrong principles. See REASON and UNDERSTANDING.

FOOL's STONES, in botany, a name given to the orchis. See ORCHIS.

FOOT, *pes*, a part of the body of moſt animals whereon they ſtand, walk, &c.

Animals are diſtinguiſhed, with reſpect to the number of their feet, into *bipedes*, two-footed; ſuch are men and birds: *quadrupedes*, four-footed; ſuch are moſt land-animals: and *multipedes*, or many-footed, as inſects. The reptile-kind, as ſerpents, &c. have no feet; the crab-kind of fiſh have got ten feet, but moſt other fiſhes have no feet at all: the ſpider, mites, and polypuſes have eight; flies, graſshoppers, and butterflies have ſix feet. Animals deſtined to ſwim, and water-fowl, have their toes webbed together, as the phocæ, gooſe, duck, &c. The fore-feet of the mole, rabbit, &c. are wonderfully formed for digging and ſcratching up the earth, in order to make way for their head.

FOOT, in anatomy. The greater foot denotes the extent from the juncture of the hip to the toe-ends, and is divided into the thigh, the leg, and the foot, properly ſo called. See THIGH and LEG.

The leſſer foot, or that properly ſo called, is divided into four parts, *viz.* the tarſus, the metatarſus, the toes, and the oſſa ſeſamoida. See the articles TARSUS, METATARSUS, TOES, and SESAMOIDA OSSA.

In examining the foot, we are to conſider its length, which is greater in man than in any other animal, in order to ſerve for his treading the firmer. It is alſo to be remarked, that the under part, or ſole, called planta, is contrived hollow in man, leſt the veſſels ſhould be preſſed on in walking, as we preſs there with our whole weight, whilſt we are in this poſture. See the article PLANTA.

FOOT, in the latin and greek poetry, a metre or meaſure, compoſed of a certain number of long and ſhort ſyllables.

Theſe feet are commonly reckoned twenty-eight, of which ſome are ſimple, as conſiſting of two or three ſyllables, and therefore called diſyllabic or triſyllabic feet; others are compound, conſiſting of four ſyllables, and are therefore called tetraſyllabic feet.

The diſſyllabic feet are four in number, *viz.* the pyrrhichius, ſpondeus, iambus, and trocheus. See PYRRHICHIUS, &c.

The triſyllabic feet are eight in number, *viz.* the dactylus, anapæſtus, tribrachys, moloſſus, amphybrachys, amphimacer, bacchius, and antibacchius. See DACTYL, &c.

The tetraſyllabic are in number ſixteen, *viz.* the proceleuſmaticus, diſpondeus, coriambus, antiſpaſtus, diiambus, dichoreus, ionicus a majore, ionicus a minore, epitritus primus, epitritus ſecundus, epitritus tertius, epitritus quartus, pæon primus, pæon ſecundus, pæon tertius, and pæon quartus. See the articles PROCELEUSMATICUS, &c.

There are ſeveral other ſorts of feet invented by idle grammarians, of five, ſix, or more ſyllables, but they are not worth the reciting. The number of feet each ſort of verſe contains, will be found under that particular verſe. See the articles HEXAMETER, &c.

Even and odd **FOOT**, in poetry, is a foot ſo denominated in reſpect of its ſituation in the verſe: thus, the firſt, third, and fifth foot of the verſe are uneven. This denomination of feet chiefly obtains in iambic verſe. See IAMBIC.

FOOT is alſo a long meaſure, conſiſting of 12 inches. See the article INCH.

Geometricians divide the foot into 10 digits, and the digit into 10 lines. See the articles DIGIT and LINE.

FOOT *ſquare*, is the ſame meaſure, both in breadth and length, containing 144 ſquare or ſuperficial inches.

Cubic, or *Solid* **FOOT**, is the ſame meaſure in all the three dimenſions, length, breadth, and depth or thickneſs, containing 1728 cubic inches.

The foot is of different lengths in different countries. The paris royal foot exceeds the engliſh by nine lines; the antient roman foot of the Capitol, conſiſted of 4 palms, equal to $11\frac{7}{10}$ inches engliſh; rhineland or leyden foot, by which the northern nations go, is to the roman foot as 950 to 1000. The proportions of the principal feet of ſeveral nations, compared with the engliſh, are as follow.

The engliſh foot being divided into 1000 parts, or into 12 inches, the other feet will be as follow:

	1000 parts.	Feet.	inch.	lines.
London-foot	1000	0	12	0
Amſterdam	942	0	11	3
Antwerp	946	0	11	2
Bologna	1204	1	2	4
Bremen	964	0	11	6
Cologne	954	0	11	4
Copenhagen	965	0	11	6
Dantzick	944	0	11	3
Dort	1184	1	2	2
Frankfort on the Main	948	0	11	4
The Greek	1007	1	0	1
Lorrain	958	0	11	4
Mantua	1569	1	6	8
Mechlin	919	0	11	0
Middleburg	991	0	11	9
Paris royal	1068	1	0	9
Prague	1026	1	0	3
Rhineland or Leyden	1033	1	0	4
Riga	1831	1	9	9
Roman	967	0	11	6
Old Roman	970	0	11	8
Scotch	1005	1	0	$\frac{5}{7}$
Straſburg	920	0	11	0
Toledo	899	0	10	7
Turin	1062	1	0	7
Venice	1162	1	1	9

FOOT *of a horſe*, in the manege, the extremity of the leg, from the cornet to the lower part of the hoof.

The four feet of a horſe are diſtinguiſhed by four different names: the far forefoot denotes the right foot before; and the near fore-foot, the ſtirrup-foot, and the bridle-hand-foot, are uſed to ſignify the left foot before: of the two hinder feet, the right is called the far hind-foot, and the left hind-foot is called the near foot behind.

It is a great imperfection in a horſe to have feet too large and fat, as alſo to have them too little: the former ſort of horſes are, for the moſt part, heavy, and apt to ſtumble; on the other hand, too ſmall feet are to be ſuſpected, becauſe they are often painful, and ſubject to cloven quarters and other imperfections.

FOOT DEROBE, in the manege. A horſe's foot gets this appellation, when it is worn and waſted by going without ſhoes, ſo that for want of hoof it is a hard matter to ſhoe him.

Fat **FOOT**, in the manege. A horſe is ſaid to have a fat foot, when the hoof is ſo thin and weak, that, unleſs the nails be driven very ſhort, he runs the riſque of being pricked in ſhoeing. The engliſh horſes are very ſubject to this diſorder.

FOOT-BANK, or **FOOT-STEP**, in fortification, the ſame with banquette. See the article BANQUETTE.

FOOT *of the foreſt*, *pes foreſtæ*, in our antient cuſtoms, contained 18 inches, or $1\frac{1}{2}$ of the common foot. See FOREST.

FOOT-GUARDS. See GUARDS.

FOOT-GELD, or **FAUT-GELD**, in our old cuſtoms, an amercement laid upon thoſe who live within the bounds of a foreſt, for not lawing or cutting out the ball of their dog's feet. To be free of a footgeld, was a privilege to keep dogs unlawed, within the bounds of a foreſt.

FOOT-HOOKS, or **FUTTOCKS**. See the article FUTTOCKS.

FOOT-HUSKS, among botaniſts, ſhort heads out of which flowers grow.

FOOT-LEVEL, among artificers, an inſtrument that ſerves as a foot-rule, a ſquare, and a level. See the articles LEVEL, RULE, and SQUARE.

FOOT-PACE, or **HALF-PACE**, among carpenters, a pair of ſtairs, whereon, after four or ſix ſteps, you arrive at a broad place, where you may take two or three paces before you aſcend another ſtep. The deſign of which is to eaſe the legs in aſcending the reſt of the ſteps. See the article STAIR-CASE.

FOOT-SOLDIERS. See INFANTRY.

Fore-FOOT, in the ſea language, the foremoſt part of the keel, which firſt takes the ground.

FORAGE, all kind of proviſion for cattle, eſpecially for horſes in time of war. See the article FORAGE.

FORAMEN, in anatomy, a name given to ſeveral apertures, or perforations in divers parts of the body; as, 1. The external and internal foramina of the cranium or ſkull. 2. The foramina in the upper and lower jaw. 3. Foramen lachrymale. 4. Foramen membranæ tympani. See the articles SKULL, JAW, LACHRYMAL, EAR, &c.

FORAMEN OVALE, an oval aperture or paſſage through the heart of a fœtus which cloſes up after birth. It ariſes above the coronal vein, near the right auricle, and paſſes directly into the left auricle of the heart, ſerving for the circulation of the blood in the fœtus, till ſuch time as the infant breathes and the lungs are open; it being generally reckoned one of the temporary parts of the fœtus, wherein it differs from an adult, altho' almoſt all anatomiſts, Mr. Cheſelden excepted, aſſure us, that the foramen ovale has ſometimes been found open in adults. See FOETUS and CIRCULATION.

The foramen ovale therefore, and the canal of communication in the fœtus are in reality no other than a ſort of ſubſidiary parts to the lungs formed only for a certain time, and to become uſeleſs and diſappear when the act of reſpiration has given the turn to the circulation of the blood, which it is to retain through the whole life of the animal. Dr. Trew affirms, that the membrane of the foramen ovale is ſo placed, as to permit the blood to paſs freely from the right auricle to the left, during the diaſtole of the auricles, but never from the left auricle to the right. See Phil. Tranſ. n° 457.

FORCALQUIER, a town of Provence, in France, thirty miles north of Aix.

FORCE, in mechanics, denotes the cauſe of the change in the ſtate of a body when being at reſt its begins to move, or has a motion which is either not uniform, or not direct.

Mechanical forces may be reduced to two ſorts, one of a body at reſt, the other of a body in motion.

The force of a body at reſt is that which we conceive to be in a body lying ſtill on a table, or hanging by a rope, or ſupported by a ſpring, and is called by the names of *preſſure*, *vis mortua*, &c. The meaſure of this force being the weight with which the table is preſſed, or the ſpring bent. See INERTIA.

The force of a body in motion, called *moving force*, *vis motrix*, and *vis viva*, to diſtinguiſh it from the *vis mortua*, is allowed to be a power reſiding in that body ſo long as it continues its motion, by means of which it is able to remove obſtacles lying in its way, to ſurmount any reſiſtance, as tenſion, gravity, friction, &c. and which in whole, or in part, continues to accompany it ſo long as the body moves. Philoſophers are fully agreed about the meaſure of the firſt of theſe forces, *viz.* *vis mortua*, notwithſtanding the deverſity of appellations by which it is called; but about the meaſure of the laſt ſort of force, or *vis viva*, they are divided into two parties.

The newtonians and carteſians maintain, that the moving force of bodies is in the compound ratio of their weights and velocities; and Leibnitz with his followers, pretend it to be in the compound ratio of the weights and the ſquares of the velocities. Thoſe who hold the firſt opinion, lay down for a principle that when two bodies meet one another in contrary directions, if their moving forces be equal, neither body will prevail over each other: and if their moving forces be unequal, the ſtronger will always prevail over the weaker. But the followers of Leibnitz deny the truth of this principle, and lay down others, which, as they pretend, are more clear and ſatisfactory; ſuch as, that it always requires a determinate degree of force to bend a given ſpring to a given degree, whether this be performed in a longer or ſhorter time, or vice verſa, and that a given ſpring bent to a given degree always communicates the ſame force to a body by unbending itſelf, whether the time it takes to unbend itſelf be longer, or ſhorter. But theſe propoſitions are alike denied by the Newtonians.

Now if the principle of the former be admitted as true, *viz.* that thoſe bodies have equal forces, which meeting each other in contrary directions do not prevail over each other, it cannot be diſputed, that bodies which have equal quantities of motion have alſo equal forces; and conſequently that the moving forces of bodies are in a compound ratio of their maſſes and velocities. On the other hand, if the principles of the Leibnitians be admitted, it is no leſs indiſputable that the forces of moving bodies will be in a compound ratio of their maſſes and the ſquares of their velocities. Thus let M and m denote the maſſes of two bodies, V and v their velocities; then if any ſpring bent to a certain degree give the body M a certain velocity V, the ſame ſpring bent to the ſame degree will never give another body m a velocity v, ſo that M V ſhall be equal to $m v$; but will always communicate ſuch a velocity to m, that M V V ſhall be equal to $m v v$. And this is admitted by the newtonians, tho' the concluſion that the forces of the bodies M and m are equal, is denied. To put an end therefore to this controverſy, other principles muſt be found; and accordingly many ſubtile reaſonings have been formed by ſeveral authors, concerning the nature of action, cauſe, effect, time, ſpace, &c. by which we believe more readers have been confounded than enlightened; ſo that after all, the controverſy ſtill ſubſiſts, though carried on near eighty years, during which time a great many pieces have been publiſhed on both ſides of the queſtion, and a great many experiments have been made, or propoſed to be made, in order to decide it; becauſe tho' both parties agree in the event of the experiments, whether actually made or only propoſed, yet as the writers on each ſide have found a way of deducing from thoſe experiments a concluſion ſuitable to their own opinion, the diſagreement ſtill continues as wide as ever, and muſt remain ſo, while the newtonians, on the one hand, aſſume that *equal preſſures in equal times produce equal moving forces*; and the leibnitians, on the contrary, maintain *that equal preſſures urging a body through equal ſpaces, produce equal forces.* Hence, ſuppoſing equal preſſures to act on equal bodies, either to produce motion in them, or to ſtop what motion they have, the queſtion will be whether the force generated or deſtroyed be proportional to the time the preſſure acts, or the ſpace thro' which it acts. For example, let two equal bodies, with velocities as 1 and 2, aſcend againſt the action of uniform gravity according to Galileo's hypotheſis, it is certain that the body whoſe velocity is 2 will reſiſt the force of gravity twice the time that the body whoſe velocity is only 1 can do: and it is no leſs certain, that the body whoſe velocity is 2 will aſcend to four times the height that the other can. So that if we meaſure the forces of theſe bodies by the preſſure and time requiſite to deſtroy their motion, theſe forces will be as the velocities of the moving bodies; but if we meaſure the forces by the preſſure and ſpace through which it extends, requiſite to deſtroy thoſe forces, we ſhall find them proportional to the ſquares of the velocities of the moving bodies. This holds in uniform preſſures, but if the preſſure be not uniform as in the action of ſprings, which preſs more or leſs as they are more or leſs bent, we muſt then have recourſe to the fluxions of the ſpace and time. Thus if p ſtand for the preſſure, t for the time, and s for the ſpace, the fluxion, or infiniteſimal element of the velocity, will, according to both parties, be expreſſed by $p\dot{t}$. According to the newtonians, this is alſo the fluxion or element of the force; but according to the followers of Leibnitz, the element of the force is proportional to $p\dot{s}$. This being the caſe, we ſhall only remark that we have not met with any concluſive argument on either ſide, nor do we believe it poſſible to demonſtrate the one or the other of theſe aſſertions till ſome body ſhall be metaphyſician enough to analyſe the notions of force, action, time, and ſpace, farther than has been hitherto done.

Some leibnitians do not aſſume it as a firſt principle, that action of force is proportional to the preſſure and ſpace; but they ſay, that a preſſure being given, its action will be proportional to the velocity of the point moved by that preſſure. Hence they infer, that the whole action of a preſſure is as its intenſity, as the velocity of the point to which it is applied, and as the time the preſſure acts. And ſpace being as the time and velocity, they conclude the action of a preſſure to be as that preſſure, and the ſpace thro' which it acts. Thus 'S Graveſande, lib. 2. cap. 2. ſect. 728, ſays, if a point runs thro' a determinate ſpace A B, and preſſes with a certain given force or intenſity of preſſure, it will perform the ſame action whether it move faſt or ſlow, and therefore

fore the time of the action in this caſe ought not to be regarded. But the newtonians do not ſubmit to this reaſoning, and inſiſt, that we cannot abandon the old doctrine concerning the meaſures of the forces of bodies in motion, without exchanging plain principles that have been generally received concerning the actions of bodies, upon the moſt ſimple and unconteſted experiments, for notions that ſeem at beſt but very obſcure. Let A and B (plate CI. fig. 2. nº 1.) be two equal bodies that are ſeparated from each other by ſprings interpoſed between them (or in any equivalent manner) in a ſpace E F G H, which in the mean time proceeds uniformly in the direction B A, in which the ſprings act, with a velocity as 1, and ſuppoſe that the ſprings imprint on the equal bodies A and B equal velocities in oppoſite directions that are each as 1. Then the abſolute velocity of A (which was as 1) will be now as 2; and, according to the new doctrine of the leibnitians, its force as 4. Whereas the abſolute velocity and the force of B (which was as 1) will be now deſtroyed; ſo that the action of the ſprings adds to A a force as 3, and ſubducts from the equal body B, a force as 1 only; and yet it ſeems manifeſt that the actions of the ſprings on theſe equal bodies ought to be equal. In general, if m repreſent the velocity of the ſpace E F G H in the direction B A, n the velocity added to that of A and ſubducted from that of B by the action of the ſprings, then the abſolute velocities of A and B will be repreſented by $m+n$ and $m-n$ reſpectively, the force added to A by the ſprings will be $2mn+nn$, and the force taken from B will be $2mn-nn$ which differ by $2nn$. Further, it is allowed that the actions of bodies upon one another are the ſame in a ſpace that proceeds with an uniform motion, as if the ſpace was at reſt. But if the ſpace E F G H was at reſt, the forces communicated by the ſprings to A and B had been equal, and the force of each had been repreſented by nn. Theſe arguments, ſays Mr. Maclaurin, are ſimple and obvious, and ſeem on that account to be the more proper, in treating this queſtion. Tho' there are certain effects (continues the ſame author) produced by the forces of bodies that are in the duplicate ratio of their velocities, we are not thence to conclude that the forces themſelves are in that ratio, no more than we are to conclude that a force which would carry a body upwards of 500 miles in a minute is infinite, becauſe it may be demonſtrated, if we abſtract from the reſiſtance of the air, that a body projected with this velocity would riſe for ever, and never return to the earth. And as reaction is only equal to action when both are eſtimated in oppoſite directions upon the ſame right line, ſo we are never to eſtimate the force which one body loſes or acquires by that which is produced or deſtroyed in another body in a different direction.

Mr. Euler obſerves, with reſpect to this diſpute concerning the meaſure of vivid force, that we cannot abſolutely aſcribe any force to a body in motion, whether we ſuppoſe this force proportional to the velocity, or to the ſquare of the velocity: for the force exerted by a body ſtriking another at reſt is different from that which it exerts in ſtriking the ſame body in motion; ſo that this force cannot be aſcribed to any body conſidered in itſelf, but only relatively to the other bodies it meets with. There is no force in a body abſolutely conſidered but its inertia, which is always the ſame, whether the body be at reſt or in motion. But if this body be forced by others to change its ſtate, its inertia then exerts itſelf as a force properly ſo called, which is not abſolutely determinable, becauſe it depends on the changes that happen in the ſtate of the body. Suppoſe, for inſtance, a body A forced to move in an incurvated tube or along the curve ſurface E a F, (*ibid.* nº 2.) the body in this caſe will preſs the ſurface wherever it touches it in a direction $a\,a$ normal to the curve; and with a certain force commonly determined in mechanics, by the maſs of the body, its velocity, and by the radius of curvature O a. Now the body exerts a preſſure or *vis mortua*, yet it would be abſurd to aſcribe a certain and determinate force of preſſure to this body conſidered in itſelf, ſince this preſſure may vary very much according to the difference of the curvature of E a F. In like manner, it ſeems unreaſonable to place a certain abſolute force of percuſſion in bodies, ſince it principally depends on the external circumſtances accompanying the ſhock. A ſecond obſervation which has been made by ſeveral great men is, that the effect of a ſhock of two or more bodies is not produced in an inſtant, but requires a certain interval of time. If this be ſo, the heterogeneity between the *vires vivæ* and *mortuæ* vaniſhes; ſince a preſſure may always be aſſigned, which in the ſame time, however little, ſhall produce the ſame effect. If then the *vires vivæ* be homogeneous to the *vires mortuæ*, and ſince we have a perfect meaſure and knowledge of the latter, we need require no other meaſure of the former than that which is derived from the *vires mortuæ* equivalent to them.

Mr. Euler has alſo given ſome calculations with reſpect to the force of percuſſion reſulting from the preſſures which elaſtic and non-elaſtic bodies exert on each other while the colliſion laſts, determining theſe preſſures for every inſtant of the ſhocks; and where the bodies are very hard, he finds the force of percuſſion to be in a compound ratio of the velocity, and of the ſubduplicate ratio of the maſs of the ſtriking body; ſo that in this caſe neither the Leibnitian, nor the Carteſian proportions take place. But as we cannot pretend to give a full account of this controverſy, we muſt refer the curious to Mr. Euler's diſſertations in the Memoirs of the Academy of Berlin, and to ſome of the principal authors on each ſide of the queſtion, ſuch as Sir Iſaac Newton, Mr. Maclaurin, Dr. Jurin, Dr. Pemberton, Mr. Robins, Monſ. de Mairan, *&c.* in favour of the old opinion; Meſſ. Leibnitz, Bernoulli, Herman, Poleni, Wolfius, 'S Graveſande, *&c.* in ſupport of the new; and ſhall only obſerve in this place, that the experiments of Deſaguliers, Poleni, *&c.* tho' they do not decide the controverſy, are nevertheleſs of great uſe, and that whatever may be ſaid of the metaphyſical part, it is certain, that no uſeful concluſion in mechanics is affected by the diſputes concerning the menſuration of the force of bodies in motion, as has been objected to mathematicians by the analyſt in Query IX.

Accelerating FORCE. See ACCELERATING.

Central FORCE. See CENTRAL.

Centrifugal FORCE. See CENTRIFUGAL.

Centripetal FORCE. See CENTRIPETAL.

FORCE *of inactivity*. See INERTIA.

FORCE *of wind*. See WIND.

FORCE, in law, ſignifies any unlawful violence offered to things or perſons, and is divided into ſimple and compound. *Simple force* is what is ſo committed, that it has no other crime attending it, as where a perſon by force enters on another's poſſeſſion without committing any other unlawful act. *Compound force*, is where ſome other violence is committed with ſuch an act which of itſelf alone is criminal; as if one enters by force into another's houſe, and there kills a perſon, or raviſhes a woman. There is likewiſe a force implied in law, as in every treſpaſs, reſcous or diſſeiſin, and an actual force with weapons, number of perſons, *&c.* Any perſon may lawfully enter a tavern, inn, or victualling-houſe; ſo may a landlord his tenant's houſe to view repairs, *&c.* But if, in theſe caſes, the perſon that enters commits any violence or force, the law will intend that he entered for that purpoſe.

Freſh FORCE. See the article FRESH.

FORCEPS, a pair of nippers, or pinchers, for laying hold of and pulling out any thing forced into another body.

FORCEPS, in ſurgery, *&c.* a pair of ſciſſars for cutting off, or dividing, the fleſhy or membranous parts of the body, as occaſion requires. See SCISSARS.

A ſurgeon ſhould be well provided with theſe; ſome ſtraight, and of different ſizes, like common ſciſſars; others crooked, proper to be uſed in fiſtulæ, and in many other caſes, (ſee plate CI. fig. 3. nº 1.) and others, again, furniſhed with teeth at one end, uſed to remove dreſſings, to extract muſket-balls, ſplinters, thorns, *&c.* and on many other occaſions, (*ibid.* nº 2.)

Forcepſes are commonly made of ſteel, but thoſe of ſilver are much neater.

FORCER, or FORCING-PUMP, in mechanics, is a kind of pump in which there is a forcer or piſton without a valve. The forcing pump conſiſts of a barrel A B C (plate CI. fig. 4. nº. 1.) in which there is a forcer I, which moves up and down in it. The barrel communicates with two pipes, the one called a ſucking-pipe B C, which goes down into the well, and the other called a forcing-pipe F G, which goes upwards. There are two valves, the one D, at any place of the pipe B C, and the other E, in the pipe F G; both which let the water go up, and hinder it from coming down. Then when the forcer is moved upwards, as it rarifies the air in the pipe B C, (for the valve E hinders the outward air which preſſes upon it from going thro') the water riſes in it, till after ſeveral ſtrokes it comes to the forcer; then at every time the forcer goes down, the water that is preſſed downwards being hindered from going thro' the valve D, opens the valve E, and goes up the pipe F G. When the forcer goes up again, then the water in the pipe F G ſhuts by its preſſure the valve E, and conſequently the water in the well riſes up the pipe B E, and the ſame happens at every motion of the forcer. It is to be obſerved in the forcing pump, that the nearer the forcer comes to the well, the better it is, for the ſame reaſon as in the ſucking pump. See the article PUMP.

There are ſeveral ways of making forcers: the moſt common of all conſiſts of a braſs-cylinder, a very little leſs in the diameter than the bore of the barrel (*ibid.* n° 2.) at the top B and at the bottom D, and turned leſs ſtill at the middle C C in order to let in a leathern collar E E (*ibid.* n° 3.) which makes it juſt equal to the bore of the barrel, ſo as to fit it quite when it is put into it. The ſecond ſort of forcers conſiſts of three braſs-cylinders A, B, C, (*ibid.* n° 4, 5, 6) which can be ſcrewed together. The middle one B ought to be almoſt equal in diameter to the bore of the pipe, ſo as to ſlide in it without any friction. The upper A and the lower C muſt be a little leſs and equal to one another. There are two leathers, D and E, (*ibid.* n° 7, 8.) which muſt be put between them when they are unſcrewed. Then it is evident, that if the cylinders be ſcrewed together, and the leathers apply themſelves folding upwards round the upper part A, and downwards round the lower C, they will become juſt equal to the bore of the barrel, and conſequently they will hinder any air from getting thro' the ſides of the forcer when it moves up and down in the barrel. The uſe of the middle braſs cylinder B is to hinder the leathers from turning themſelves back by the motion.

But the beſt way of making forcers is to have a plunger, or ſolid braſs-cylinder A (*ibid.* n° 9.) equal in length to the barrel, and a little leſs in diameter than the bore, ſo that it can move freely in it without any friction: there muſt be two hollow ſhort braſs rings C C, D D, (*ibid.* n° 10, 11.) at the top of the barrel F, (*ibid.* n° 12.) which can be ſcrewed together. The upper one C C muſt be equal in bore to it, and the lower D a little leſs. There are two leathers as in (n° 7, 8.) both having in the middle a leſs hole than the bore of the pipe.

The one muſt be applied between the barrel and the ring D, and the other between the ring D and the upper one C, and the whole muſt be ſcrewed together. Then if the ſolid cylinder A (n° 9.) be put into it and moved up and down, it is evident that the forementioned leathers which are applied the one to the barrel, the other to the inſide of the hollow cylinder C will hinder any air from getting between them and the ſolid cylinder A. The advantage of this kind of forcers is, that they have no other friction but at the top of the barrel, and that the inſide of the barrel need not be ſmooth as in other kinds of pumps, but only the outſide of the forcer A muſt be turned true and poliſhed, which can be done a great deal eaſier. The lower part of the forcer A muſt be turned a little conical, that it may be brought into the barrel, without any reſiſtance of the upper leather of the above-mentioned collar or jack-head. See the article PISTON.

FORCHAIN, a town of Franconia, in Germany, ſixteen miles ſouth of Bamberg.

FORCIBLE, in law, ſomething done illegally. See the article FORCE.

A FORCIBLE *entry*, is a violent and actual entry into houſes, or lands; and a forcible detainer, is where one by violence with-holds the poſſeſſions of lands, *&c.* ſo that the perſon who has a right of entry is barred, or hindered therefrom.

At common law, any perſon that had a right to enter into lands, *&c.* might retain poſſeſſion of them by force. But this liberty being abuſed, to the breach of the peace, it was therefore found neceſſary that the ſame ſhould be reſtrained. Tho' at this day, he who is wrongfully diſpoſſeſſed of goods may by force retake them. By ſtatute, no perſon ſhall make an entry on any lands or tenements, except where it is given by law, and in a peaceable manner, even though they have title of entry, on pain of impriſonment; and where a forcible entry is committed, juſtices of peace are authorized to view the place, and enquire of the force by a jury, ſummoned by the ſheriff of the county: and they may cauſe the tenements, *&c.* to be reſtored, and impriſon the offenders till they pay a fine. Likewiſe a writ of forcible entry lies, where a perſon ſeized of freehold, is by force put out thereof. See ENTRY.

FORCIBLE MARRIAGE of a woman having eſtates in lands, *&c.* is felony by law, and the takers, procurers, abettors, and receivers of the woman ſo taken away againſt her will, and knowing the ſame, are likewiſe deemed principal felons; but as to the procurers and abettors, they muſt be ſuch before the fact committed, to be excluded benefit of clergy.

FORCING, among gardeners, ſignifies the making trees produce ripe fruit before their uſual time. This is done by planting them in a hot bed againſt a ſouth-wall, and likewiſe defending them from the injuries of the weather by a glaſs frame. They ſhould always be grown trees, as young ones are apt to be deſtroyed by this management. See HOT-BED. The glaſſes muſt be taken off at proper ſeaſons, to admit the benefit of freſh air, and eſpecially of gentle ſhowers.

FORCING OF WINE. See WINE.

FORCING-PUMP. See FORCER, *ſupra*.

FORE-CASTLE *of a ſhip*, that part where the foremaſt ſtands. It is divided from the reſt by a bulk-head. See the article SHIP.

FORE-CLOSED, in law, ſignifies the being ſhut out, and excluded, or barred, the equity of redemption on mortgages, *&c.*

FORE-FOOT, in the ſea-language, ſignifies one ſhip's lying, or ſailing, croſs another's way: as if two ſhip's being under ſail, and in ken one of another, one of them lying in her courſe with her ſtem ſo much a weather the other, that holding on their ſeveral ways, neither of them altering their courſes, the windward ſhip will run a head of the other: then it is ſaid, ſuch a ſhip lies with the other's forefoot.

FOREIGN, ſomething extraneous, or that comes from abroad.

FOREIGN, in our law, is uſed in various ſignifications. Thus,

FOREIGN ATTACHMENT is an attachment of the goods of foreigners, found within a city, or liberty, for the ſatisfaction of ſome citizen, to whom the foreigner is indebted; or it ſignifies an attachment of a foreigner's money in the hands of another perſon. See ATTACHMENT.

FOREIGN KINGDOM, a kingdom under the dominion of a foreign prince.

At the inſtance of an embaſſador, or conſul, an offender againſt the laws here may be ſent for hither from a foreign kingdom. And where a ſtranger of Holland, or any foreign country, buys goods at London, for inſtance, and there gives a note under his hand for payment, after which he goes away privately into Holland; in that caſe, the ſeller may have a certificate from the lord mayor, on the proof of the ſale and delivery of ſuch goods, whereupon a proceſs will be executed on the party in Holland.

FOREIGN-MATTER, any thing which is done, and, therefore, triable in another country.

FOREIGN OPPOSER, or APPOSER, an officer in the exchequer, that appoſes, or makes a charge on all ſheriffs, *&c.* of their green wax: that is to ſay, fines, iſſues, amerciaments, recognizances, *&c.*

FOREIGN PLEA, ſignifies an objection to the judge of the court, by refuſing him as incompetent, becauſe the matter in queſtion is not within his juriſdiction. All foreign pleas that are triable by the country on any indictment for murder, or felony, ſhall be tried, without delay, before the juſtices, where the party is arraigned, and by the jurors of the ſame county, though the matters of ſuch pleas are alledged to be in any other county or counties: but this does not extend to treaſon, nor to appeals; a foreign iſſue wherein muſt be tried, as formerly, by a jury of that county where the fact is laid. If a foreign plea is pleaded in a civil action, the court generally makes the defendant put it in upon oath that the ſame is true, or will cauſe judgment to be entered for want of a plea.

FOREIGN SERVICE, that ſervice by which a mean lord holds of another without the compaſs of his own fee; or it is that which the tenant performs either to his own lord, or the lord paramount, out of the fee.

FOREIGN SEAMEN ſerving two years on board britiſh ſhips, whether of war, trade, or privateers, during the time of war, ſhall be deemed natural-born ſubjects.

FOREIGNER, the natural-born ſubject of ſome foreign prince.

Foreigners, tho' made denizens, or naturalized, are diſabled to bear any office in the government, to be of the privy-council, or members of parliament, *&c.* This is by the acts of the ſettlement of the crown. Such perſons as are not freemen of a city, or corporation, are alſo called foreigners, to diſtinguiſh them from the members of the ſame.

FOREJUDGER, in law, ſignifies a judgment, whereby one is deprived or put by a thing in queſtion.

To be forejudged the court is where an officer, or attorney, of any court, is expelled the ſame, for male-practice; or for not appearing to an action on a bill filed againſt him, &c. And where an attorney of the common pleas is ſued, the plaintiff's attorney delivers the bill to one of the criers of the court, who calls the attorney defendant, and ſolemnly proclaims aloud, that if he does not appear thereto, he will be forejudged; likewiſe a rule is given by the ſecondary for his appearance, and if the attorney appears not in four days, then the clerk of the warrants ſtrikes ſuch an attorney off the roll of attornies; after which he becomes liable to be arreſted like any other perſon: but where an attorney is forejudged, he may be reſtored on clearing himſelf from his contumacy, and making ſatisfaction to the plaintiff, &c.

FORE KNIGHT, in the ſea-language, a piece of wood carved in the figure of a man's head, and faſt bolted to the beams upon the ſecond deck.

FORELAND, in the ſea-language, the ſame with a cape. See the article CAPE.

FORELAND, in fortification, a ſmall piece of ground between the wall of a place and the moat, called alſo *berme*, and *liziere*.

FORELOCKS, in the ſea-language, little flat wedges made with iron, uſed at the ends of bolts, to keep them from flying out of their holes.

FORELOIN, among huntſmen, is when a hound, going before the reſt of the cry, meets chace, and goes away with it.

FORELORN-HOPE, in the military art ſignifies men detached from ſeveral regiments, or otherwiſe appointed, to make the firſt attack in day of battle, or, at a ſiege, to ſtorm the counterſcarpe, mount the breach, or the like.

They are ſo called from the great danger they are unavoidably expoſed to; but the word is old, and begins to be obſolete.

FOREMAST *of a ſhip*, a large, round piece of timber, placed in her fore-part, or fore-caſtle, and carrying the foreſail and fore-top-ſail yards. Its length is uſually $\frac{8}{9}$ of the main maſt. And the fore-top gallant-maſt is $\frac{1}{2}$ the length of the fore-top-maſt. See the article MAST.

FOREMAST-MEN are thoſe on board a ſhip that take in the top-ſails, ſling the yards, furl the ſails, bowſe, trice, and take their turn at the helm, &c.

FORE-RAKE, in the ſea-language. See the article RAKE.

FORE-REACH, in the ſea-language, a ſhip is ſaid to fore-reach upon another, when both ſailing together, one ſails better, or out-goeth the other.

FORESCHOKE, in our old authors, ſignifies the ſame with foreſaken, and is particularly uſed in one of our ſtatutes for lands or tenements ſeiſed by the lord for want of ſervices performed by his tenant, and quietly held by ſuch lord above a year and a day, without any due courſe of law taken by the tenant for recovery thereof; here he does in preſumption of law diſavow or forſake all the rights he has thereto, for which reaſon thoſe lands ſhall be called foreſchoke.

FORE-SKIN, in anatomy, the ſame with prepuce. See the article PREPUCE.

FOREST, *ſylva*, in general a great wood, or a large extent of ground covered with trees.

FOREST, in law, is defined, by Manwood, a certain territory of woody grounds, and fruitful paſtures, privileged for wild beaſts and fowls of foreſt, chace and warren, to reſt and abide under the protection of the king, for his princely delight, bounded with unremoveable marks, and meres, either known by matter of record or preſcription; repleniſhed with wild beaſts of venery, or chace, with great coverts of vert for the ſaid beaſts; for preſervation and continuance whereof, with the vert and veniſon, there are certain particular laws, privileges and officers.

Foreſts are of that antiquity in England, that, excepting the new foreſt in Hampſhire, erected by William the Conqueror, and Hampton-Court, erected by Henry VIII. it is ſaid, that there is no record or hiſtory which makes any certain mention of their erection, though they are mentioned by ſeveral writers, and in divers of our laws and ſtatutes.

There are ſixty-nine foreſts in England, thirteen chaces, and 800 parks. The four principal foreſts are New-Foreſt, Sherwood-Foreſt, Dean-Foreſt, and Windſor-Foreſt.

The manner of erecting a foreſt is thus, *viz.* Certain commiſſioners are appointed under the great ſeal, who view the ground intended for a foreſt, and fence it round: this commiſſion being returned into chancery, the king cauſeth it to be proclaimed throughout the county where the land lieth, that it is a foreſt, and prohibits all perſons from hunting there, without his leave. Tho' the king may erect a foreſt on his own ground and waſte, he may not do it on the ground of other perſons without their conſent; and agreements with them for that purpoſe, ought to be confirmed by parliament.

A foreſt, ſtrictly taken, cannot be in the hands of any but the king, for no perſon but the king has power to grant a commiſſion to be juſtice in eyre of the foreſt; yet, if he grants a foreſt to a ſubject, and that on requeſt made in the Chancery, that ſubject and his heirs ſhall have juſtices of the foreſt, in which caſe the ſubject has a foreſt in law.

A ſecond property of a foreſt is the courts thereof, as the juſtice ſeat, the ſwainmote, and the court of attachment. See the article ATTACHMENT, *&c.*

A third property is the officers belonging to it, as the juſtices, warden, verderer, foreſter, agiſtor, regarder, keeper, bailiff, beadle, *&c.* See the articles AGISTOR, BAILIFF, FORESTER, *&c.*

By the laws of the foreſt, the receivers of treſpaſſers in hunting, or killing of the deer, if they know them to be the king's property, are principal treſpaſſers. Likewiſe, if a treſpaſs be committed in a foreſt, and the treſpaſſer dies, after his death, it may be puniſhed in the life-time of the heir, contrary to common law. Our Norman kings puniſhed ſuch as killed deer in any of their foreſts with great ſeverity; alſo in various manners; as by hanging, loſs of limbs, gelding, and putting out eyes. By *magna charta de foreſta*, it is ordained, that no perſon ſhall loſe life or member for killing the king's deer in foreſts, but ſhall be fined; and if the offender has nothing to pay the fine, he ſhall be impriſoned a year and a day, and then be delivered, if he can give ſecurity, not to offend for the future, *&c.* 9 Hen. III. c. 1.

Before this ſtatute, it was felony to hunt the king's deer; and by a late act, perſons armed and diſguiſed, appearing in any foreſt, *&c.* if they hunt, kill, or ſteal any deer, *&c.* are guilty of felony. 9 Geo. I. c. 22.

He who has any licence to hunt in a foreſt or chace, *&c.* is to take care that he do not exceed his authority: otherwiſe he ſhall be deemed a treſpaſſer from the beginning, and be puniſhed for that fact, as if he had no licence.

FOREST-TREES. Many are averſe to pruning of foreſt-trees; but tho' it is to be done with care, yet it is by no means to be wholly omitted. It is obſervable in moſt foreſts, that, where one tree thrives well, there are twenty that grow faulty, all owing to their want of pruning, or lopping in a proper manner: for this, when wiſely executed, is not only a renewal of their age, but of their growth too; the want of it being the occaſion of trees running out with ſuckers, and over-loading themſelves with waſteful boughs, which draw all the ſap from the upper part of the tree, and make it knotty, moſſy, and unthrifty.

If a tree grows crooked, at the crooked place cut it off, ſloping upwards, and nurſe up one of the principal ſhoots to be a leading ſhoot, except it is of ſuch a ſort as is ſubject to die when headed: crooked trees may be made ſtraight by ſhredding up the ſide-branches, till you come above the crook where they are young. If any boughs are cropt by goats, or other cattle, cut them off cloſe to the body, for cattle leave a drivel where they bite, which not only infects the branches, but ſometimes endangers the whole tree. See the articles LOPPING, PRUNING, and TREE.

Aſſiſe of a FOREST. See ASSISE.

Charter of a FOREST. See the article CHARTER.

Drift of the FOREST. See DRIFT.

Foot of the FOREST. See the article FOOT.

Keeper of the FOREST. See KEEPER.

Preambulation of the FOREST. See the article PREAMBULATION.

Repoſition of the FOREST. See the article REPOSITION.

Waſte of the FOREST. See WASTE.

FOREST-TOWNS, in geography, certain towns of Swabia, in Germany, lying along the Rhine, and the confines of Switzerland, and ſubject to the houſe of Auſtria. Their names are Rhinefield, Seckingen, Lauſenburg, and Waldſhut.

FORE-STAFF, or CROSS-STAFF, an inſtrument uſed at ſea for taking the altitude of the ſun, moon, or ſtars. It is called fore-ſtaff, becauſe the obſerver, in uſing it, turns his face towards the object; whereas in uſing Davis's quadrant, the back of the obſerver is towards the object; and hence its denomination of back-ſtaff. See the article BACK-STAFF.

The fore ſtaff is a ſquare graduated ſtaff A B, (plate CII. fig. 1. nº 1.) about three feet long, and half an inch thick. Each ſide is graduated like a line of tangents, and has a peculiar croſs piece or vane, which ſlides thereon. The firſt croſs piece, F F, belongs to that ſide where the diviſions begin at 3°, and end with 10°;

10°; and hence called the ten-croſs; The ſecond, E E, is called the thirty-croſs, as belonging to that ſide where the degrees begin at 10° and end at 30°. The third, D D, is called the ſixty-croſs, as belonging to that ſide of the inſtrument where the diviſions begin at 20° and end at 60°. The fourth croſs-piece, C C, is called the ninety-croſs, as belonging to that ſide where the diviſions begin at 30° and end at 90°.

For the manner of graduating the ſtaff A B like a line of tangents. See the article TANGENT.

To obſerve the ſun's altitude by this inſtrument. Firſt conſider, as near as you can gueſs, whether the altitude be under 10°; in which caſe, the ſhorteſt or ten-croſs is to be uſed. If the altitude be gueſſed to be above 10°, but under 30°, the thirty-croſs is to be uſed; if under 60°, the ſixty-croſs; and if above 60°, the ninety-croſs. Having fitted on the proper croſs, place the flat end of the ſtaff A (*ibid.* n° 2.) to the outſide of the eye, and look for the object at the upper end of the croſs D; and for the horizon, at the lower end C; moving the croſs backward and forward on the ſtaff, till you ſee the center of the ſun, or other object, by the upper end D, and the horizon by the lower end C. Then the degrees and minutes cut by the inner edge of the croſs, on the proper ſide of the ſtaff for that croſs, make the altitude of the ſun or ſtar at the time of obſervation. In order to enable the eye to bear the ſplendor of the ſun, a coloured glaſs is uſed at the top of the croſs. If the meridian altitude be required, continue your obſervation as long as the altitude of the object increaſes, ſtill moving the croſs nearer to the eye.

By fitting a horizontal vane on the eye-end of the ſtaff A, (*ibid.* n° 2.) and a ſight-vane on the lower end of the proper croſs at C, the ſun's altitude may be found with the obſerver's back turned towards the luminary: for looking through the ſight-vane at C, let the croſs-piece be moved up or down, till the ſhadow made by its upper end fall on the ſlit in the horizontal vane; the horizon being ſeen at the ſame time through the vanes at C and A; then will the degrees cut on the proper ſide of the ſtaff, be the ſun's altitude required.

FORESTAGE, in our old law-writers, a duty ſaid to have been formerly paid by foreſters to the king. See FORESTER.

FORESTALLER, a perſon who is guilty of foreſtalling. See the next article.

FORESTALLING, in law, buying or bargaining for any corn, cattle, victuals, or merchandize in the way as they come to fairs or markets to be ſold, before they get thither, with an intent to ſell the ſame again at a higher price.

The puniſhment for this offence, upon conviction at the quarter ſeſſions, by two or more witneſſes, is, for the firſt time, two months impriſonment and the loſs of the goods, or the value; for the ſecond offence, the offender ſhall be impriſoned ſix months, and loſe double the value of the goods; for the third offence, he ſhall ſuffer impriſonment during the king's pleaſure, forfeit all his goods and chattels, and ſtand on the pillory: but the ſtatute does not extend to maltſters buying barley, or to badgers licenſed.

FORESTER, a ſworn officer of the foreſt, appointed by the king's letters patent, to walk the foreſt at all hours, watch over the vert and veniſon; alſo to make attachments and true preſentments of all treſpaſſes committed within the foreſt. See the article FOREST.

If a man comes into a foreſt in the night, a foreſter cannot lawfully beat him before he makes ſome reſiſtance; but in caſe ſuch a perſon reſiſts the foreſter, he may juſtify a battery. And a foreſter ſhall not be queſtioned for killing a treſpaſſer that, after the peace cried to him, will not ſurrender himſelf, if it be not done on any former malice; though, where treſpaſſers in a foreſt, *&c.* do kill a perſon that oppoſes them, it is murder in all, becauſe they were engaged in an unlawful act, and therefore malice is implied to the perſon killed.

FORE-TOP-MAST, and FORE-TOP-GALLANT-MAST. See FORE-MAST.

FORFAR, the capital of the county of Angus, in Scotland: weſt long. 2° 32′, and north lat. 56° 25′.

It is a parliament-town, claſſed with Perth, Dundee, Cowper, and St. Andrews, which altogether ſend one member.

FORFEITURE, properly ſignifies the effect of tranſgreſſing ſome penal law, and extends to lands or goods.

Forfeiture differs from confiſcation, in that the former is more general, whilſt confiſcation is particularly applied to ſuch things as become forfeited to the king's exchequer; and goods confiſcated, are ſaid to be ſuch as no body claims.

Full FORFEITURE, *plena forisfactura*, called alſo *plena wita*, is the forfeiture of life and member, and all that a perſon has: this obtains in criminal caſes, as where a perſon is attainted of treaſon, felony, *&c.* There is alſo a forfeiture in civil caſes, as where a perſon hath an eſtate for life or years, he may forfeit it by alienation and claiming, or granting a larger eſtate than is veſted in him. All the lands or tenements of an offender, whether held in fee or tail, are forfeited on his committing high treaſon; and the king ſhall be deemed in poſſeſſion thereof without any office found, ſaving the rights of others. For petit treaſon, murder, robbery, burglary, and all felonies puniſhed with death, the offenders forfeit their lands in fee, goods and chattels. In manſlaughter, goods and chattels are forfeited; ſo in chance-medly, and ſe defendendo, though here an offender has his pardon of courſe. In the caſe of petit larceny, goods are alſo forfeited. See the article TREASON, *&c.*

FORFEITURE *of marriage*, a writ which formerly lay againſt a perſon that held lands by knights ſervice, who, being under age and unmarried, refuſed her whom the lord offered him, without diſparagement, and married another.

FORFEX, among ſurgeons, the ſame with forceps. See the article FORCEPS.

Some alſo call an inſtrument for drawing teeth by the name of forfex.

FORFICULA, the EAR-WIG, in zoology, a troubleſome inſect, which takes its engliſh name from its introducing itſelf into peoples ears, where it cauſes a great deal of pain; and its latin name, *forficula*, from its forked tail, which is a ſort of forceps, capable of pinching. The exterior wings are very ſhort or dimidiated, and wholly cover the inner ones. The antennæ are long and ſlender, conſiſting of thirteen or fourteen articulations.

According to Lemery, the dried powder of theſe inſects, is good in caſes of deafneſs; and the oil drawn from them, in convulſive caſes.

FORFICULA MARINA, the SEA-EAR-WIG, an inſect found about the ſea-ſhores, and ſo called from its reſemblance to the common ear-wig.

FOREFIELD, among miners, the fartheſt place of a meer of ground.

FORGE, properly ſignifies a little furnace, wherein ſmiths and other artificers of iron or ſteel, *&c.* heat their metals red hot, in order to ſoften and render them more malleable and manageable on the anvil. See the article FURNACE.

The forge uſed by the ſeveral operators in iron, is very ſimple: we ſhall inſtance in that of the black-ſmiths, to which all the reſt are reducible, the conſtruction of which is as follows. The hearth or fire-place of the forge, marked A. (See plate of ſmithery, fig. 1.) is to be built up from your floor with brick, about two feet and an half, or ſometimes more, according to the purpoſe you deſign to forge for: if your forge be intended for heavy work, your hearth muſt lie lower than it need be for light work: the forge may be of what breadth is thought convenient. It may be built with hollow arches underneath, to ſet ſeveral things out of the way: the back of it is built upright to the top of the ceiling, and incloſed over the fire-place with a hovel, which ends in a chimney, to carry away the ſmoke, as at B. In the back of the forge, againſt the fire-place, is fixed a thick iron-plate, and a taper pipe in it, about five inches long, which pipe comes through the back of the forge at C. Into this taper pipe is placed the noſe or pipe of the bellows: the office of this tewel is to preſerve the pipe of the bellows and the back of the forge about the fire-place, from burning. Right before the back is placed, at about two feet diſtance, the trough, which reaches commonly the whole breadth of the forge, and is as broad as is thought neceſſary, as at D. The bellows is placed behind the back of the forge, having one of its boards ſo fixed, that it can neither move upwards nor downwards. At the ear of the upper board is faſtened a rope or chain at E, which reaches up to the rocker, and is faſtened there to the further end of the handle, at F. This handle is faſtened acroſs a rock-ſtaff, which moves between two cheeks upon the center pins, in two ſockets, at G; ſo that by drawing down this handle, the moving board of the bellows riſes; and by a conſiderable weight ſet on the top of its upper board, ſinks down again, and by this agitation performs the office of a pair of bellows. See the article BELLOWS and SMITHERY.

FORGE is alſo uſed for a large furnace, wherein iron-ore, taken out of the mine, is melted down; or it is more properly applied to another kind of furnace, wherein the iron-ore, melted down and ſeparated in a former furnace, and then caſt into ſows and pigs, is heated and fuſed over again, and beaten afterwards with large hammers, and thus rendered more ſoft, pure, ductile, and fit for uſe.

Of theſe there are two kinds: the firſt is called the finery, where the pigs are worked into groſs iron, and prepared for the ſecond, which is called the chafery, where it is further wrought into bars fit for uſe. See the articles FORGING, FINERY, and CHAFERY.

FORGER, in law, one guilty of forgery. See the next article.

FORGERY, in a legal ſenſe, is where a perſon fraudulently makes and publiſhes falſe writings to another's prejudice: or, it ſignifies the writ that lies againſt him who offends that way.

Forgery is either at common law, or by ſtatute; and is an offence puniſhable by indictment, information, *&c.* and not only where a perſon makes a falſe deed, but where any fraudulent alteration is made of a true one, in a material point thereof. Likewiſe a writing may be ſaid to be forged, where one being directed to draw up a will for another, does inſert ſome legacies therein falſely of his own head; though, in ſuch caſes, there is no forgery of the hand or ſeal of the party: but a perſon cannot regularly be guilty of this crime by an act of omiſſion, unleſs it alters the limitation of an eſtate to another, in which caſe it may be forgery. By a ſtatute of George II. c. 25. the forging or counterfeiting any deed, will, bond, bill, note, *&c.* with intent to defraud any perſon, or publiſhing ſuch falſe deed, bond, *&c.* knowingly, is declared to be felony; and the offender ſhall ſuffer death. The king may pardon the corporal puniſhment of forgery which tends to public example, tho' the plaintiff cannot releaſe it: yet in an extraordinary caſe, a forgery has been compounded, and the defendant diſcharged on paying a ſmall fine.

FORGING, in ſmithery, the beating or hammering iron on the anvil, after having firſt made it red hot in the forge, in order to extend it into various forms, and faſhion it into works. See the article FORGE.

There are two ways of forging and hammering iron; one is by the force of the hand, in which there are uſually ſeveral perſons employed, one of them turning the iron and hammering likewiſe, and the reſt only hammering. The other way is by the force of a water-mill, which raiſes and works ſeveral huge hammers beyond the force of man; under the ſtrokes whereof the workmen preſent large lumps or pieces of iron, which are ſuſtained at one end by the anvils, and at the other by iron-chains faſtened to the ceiling of the forge. See MILL.

This laſt way of forging is only uſed in the largeſt works, as anchors for ſhips, *&c.* which uſually weigh ſeveral thouſand pounds. For the lighter works, a ſingle man ſerves to hold, heat, and turn with one hand, while he hammers with the other.

Each purpoſe the work is deſigned for, requires its proper heat; for if it be too cold, it will not feel the weight of the hammer, as the ſmiths call it, when it will not batter under the hammer; and if it be too hot, it will red-ſear, that is, break or crack under the hammer.

The ſeveral degrees of heats the ſmiths give their irons, are, firſt, a blood-red heat; ſecondly, a white flame-heat; and, thirdly, a ſparkling or welding heat. See the article HEAT.

FORISFAMILIARI, in law, is where a ſon accepts of his father's part of lands, *&c.* in the lifetime of the father, and reſts contented with it, ſo that he cannot claim any more; upon which account he is termed foriſfamiliari.

FORKED HEADS, among ſportſmen, thoſe deers-heads which have their croches doubled.

FORK-TAIL, a name given in ſome parts of the kingdom to the ſalmon, in the fourth year of its growth.

FORLI, a town of Romania, in the pope's territories, fifteen miles ſouth-weſt of Ravenna.

FORLORN, or FORELORN. See the article FORELORN.

FORM, *forma*, in phyſics, the eſſential or diſtinguiſhing modification of the matter whereof a natural body is compoſed, ſo as thereby to give it ſuch a particular manner of exiſtence; being that which conſtitutes it ſuch a particular body, and diſtinguiſhes it from every other body. The origin of forms, though eſteemed the nobleſt, hath yet been found one of the moſt perplexed inquiries in philoſophy, eſpecially as managed by the ſchools. The ſum of the controverſy is whether the form of natural things be, in generation, educed out of the power of the matter; or whether theſe forms are true ſubſtantial entities, diſtinct from the other ſubſtantial principle of natural bodies, that is matter.

The reaſons which move me to embrace the negative, ſays Mr. Boyle, are principally theſe. Firſt, I ſee no neceſſity for admitting any ſuch ſubſtantial forms in natural things; matter and its accidents being ſufficient to explain as much of the phænomena of nature as we are likely to underſtand. In the next place, I ſee no uſe of this puzzling doctrine of ſubſtantial forms in natural philoſophy; nor can I imagine how a particular phænomenon ſhould be explained by a principle whoſe nature is unknown: and, laſtly, I cannot conceive how forms could be generated, as the peripatetics would have it.

On the other hand, the ſchoolmen tell us, that the power of matter, with regard to forms, is partly eductive, as the agent can make the form out of it; and partly receptive, whereby it can receive the form ſo made: but ſince the ſchoolmen will not allow that the form of a generated body was actually pre-exiſtent in its matter, or any where elſe, it is hard to conceive how a ſubſtance can be educed out of another ſubſtance totally diſtinct in nature from it, without being before ſuch eduction actually exiſtent in it. And as for the receptive power of the matter that fits it to receive or lodge a form, when united with it, how can it intelligibly be made to appear to contribute to the production of a new ſubſtance of a quite different nature from that matter, though it harbours it, when produced.

In ſhort, the form of a natural body, as is illuſtrated and confirmed by Sir Iſaac Newton's doctrine of motion, (ſee Newton's Optic. p. 372, 373.) is but an eſſential modification, and, as it were, the ſtamp of its matter; or ſuch a convention of the magnitude, ſhape, motion or reſt, ſituation and contexture of the ſmall parts that compoſe it, as is neceſſary to conſtitute and denominate it a particular body; and all thoſe accidents being producible in matter by local motion, we may well ſay that the firſt and univerſal, though not immediate cauſe of forms, is no other than God, who put matter into motion, eſtabliſhed its laws among bodies, and alſo guided it, in ſeveral caſes, at the beginning of things; and that among ſecond cauſes, the grand efficient of forms is local motion, which by variouſly dividing, ſequeſtring, tranſpoſing, and connecting the parts of matter, produces in them thoſe accidents and qualities upon account whereof the portion of matter they diverſify belongs to a determinate ſpecies of natural bodies: yet this is not ſo to be underſtood as if motion were only an efficient cauſe in the generation of bodies, for it is alſo frequently one of the chief accidents, as in water, fire, &c. that concur to make up the form. See the articles MOTION and FIRE.

Some modern writers, as particularly Sennertus, teach us, that beſides the ſpecific form in plants and animals, there reſide, and eſpecially in ſome determinate parts of them, certain other forms proper to thoſe parts, but ſo ſubjected to the predominant form, as to deſerve the title of ſubordinate; being, during the reign of the ſpecific form, ſubſervient to it: though, when the ſpecific form comes to be aboliſhed, theſe ſubordinate forms may ſet up for themſelves, and in reference to thoſe parts of matter they belong to, exerciſe the functions of ſpecific forms; as in a dog or a horſe, beſides the ſenſative ſoul, which is the ſpecific form of the whole creature, the fleſh, blood, and bones have their diſtinct forms appertaining to them, though they are ruled and employed by the ſoul, but as the matter which ſhe animates and informs; and when by death the ſenſative ſoul or ſpecific form is depoſed or aboliſhed, the body is not preſently reſolved into its ſeveral elements, but thoſe ſubordinate forms ſtill preſerve the fleſh, as in the ſtate of the fleſh; and the bones, as in the ſtate of the bones; the one for a little, and the other for a much longer time. This doctrine is urged from the ſpecific virtues obſervable in gathered plants, as the purgative faculty of rhubarb, ſena, and other cathartic vegetables. But, ſays Mr. Boyle, it were not difficult to propoſe experiments, which would determine this matter otherwiſe, were it important enough to deſerve it. However, as this doctrine of ſubordinate forms affords ſuch countenance to that of ſubſtantial ones, that author has been at the pains to prove, that ſubordinate forms are explicable upon other principles. See Shaw's Boyle, vol. I. p. 224.

FORM *of ſyllogiſms*, or *ſyllogiſtic* **FORM**, among logicians, a juſt diſpoſition both of the terms, in reſpect of predicate and ſubject, and of the propoſitions, in reſpect of quantity and quality: by which is only meant a diſpoſition wherein the concluſion follows duly and legitimately from the two premiſes; there being no form, where there is no concluſion. See the article SYLLOGISM.

FORM, in theology, is ſaid to be one of the eſſential parts of the ſacraments; being that which gives them their ſacramental nature and efficacy, and conſiſting in certain words, which the prieſt pronounces in adminiſtring them.

FORM is alſo uſed, in a moral ſenſe, for the manner of being or doing a thing according to rules: thus we ſay, a form of government, a form of argument, &c.

FORM, in law, the rules eſtabliſhed and requiſite to be obſerved in legal proceedings.

FORM, in carpentry, is uſed to denote the long ſeats or benches in the choirs of churches or in ſchools, for the prieſts, prebends, religious, or ſcholars to ſit on. At ſchools, the word form is frequently applied to what is otherwiſe termed a claſs. See the article CLASS.

FORM alſo denotes the external appearance or ſurface of a body, or the diſpoſition of its parts, as to the length, breadth, and thickneſs. See the article FIGURE.

FORM is alſo uſed, among mechanics, for a ſort of mould, whereon any thing is faſhioned or wrought: as the hatters form, the paper-makers form, &c.

Printer's FORM, an aſſemblage of letters, words and lines, ranged in order, and ſo diſpoſed into pages by the compoſitor; from which, by means of ink and a preſs, the printed ſheets are drawn.

Every form is incloſed in an iron-chaſe, wherein it is firmly locked by a number of pieces of wood; ſome long and narrow, and others of the form of wedges. There are two forms required for every ſheet, one for each ſide; and each form conſiſts of more or fewer pages, according to the ſize of the book.

FORM, in hunting, the ſeat of a hare; or the place and time, when and where ſhe ſquats.

FORM *of a ſeries*, in algebra, that affection of an undeterminate ſeries, which ariſes from the different values of the indices of the known quantity. See the article SERIES.

FORMA PAUPERIS, in law, is when a perſon has juſt cauſe of ſuit, but is ſo poor, that he cannot defray the uſual charges of ſuing at law or in equity; in which caſe, on making oath that he is not worth 5l. in the world, on all his debts being paid, and producing a certificate from ſome lawyer that he has good cauſe of ſuit, the judge will admit him to ſue in forma pauperis; that is, without paying any fee to counſellors, attornies, or clerk: the ſtatute 11 Hen. VII. c. 12. having enacted, that council and attornies, &c. ſhall be aſſigned ſuch poor perſons gratis. Where it appears that any pauper has ſold or contracted for the benefit of his ſuit, whilſt it is depending in court, ſuch cauſe ſhall be thenceforth totally diſmiſſed; and a perſon ſuing in forma pauperis, ſhall not have a new trial granted him, but is to acquieſce in the judgment of the court.

FORMAL, ſomething belonging to, or conſtituting the form of a thing. See the article FORM.

FORMAL CAUSE. See the article CAUSE.

FORMALLY, *formaliter*, a term of various import in the ſchools. 1. Sometimes it denotes a ſubject, in which the predicate is contained merely on account of its form: thus white implies whiteneſs. 2. In a ſynonymous ſenſe with adequately. 3. For really, &c. See the article FORM.

FORMALITY, in the ſchools, that quality which conſtitutes the form of a thing. See the article FORM.

FORMALITY, in matters of law and polity, certain rules of judiciary proceedings, negociations, and contracts, which cuſtom or law hath made neceſſary, and therefore ought to be ſtrictly obſerved. See the article CEREMONY.

FORMATION, in philoſophy, an act whereby ſomething is formed or produced. For the formation of the fœtus in the womb, ſee the article FOETUS and GENERATION.

FORMATION *of ſtones*. See the article LITHOGENESIA.

FORMATION *of metals and minerals*. See the articles METAL and MINERAL.

FORMATION, in grammar, ſignifies the manner of forming one word from another: thus accountantſhip is formed from accountant, and this laſt from account.

FORMATUM PUNCTUM. See the article PUNCTUM.

FORME', or CROSS FORMY, in heraldry, a croſs narrow in the center, and broad at the extremities, otherwiſe called patée. See the article PATE'E.

FORMED, or FIGURED STONES, among naturaliſts. See the article STONE.

FORMEDON, in law, a writ that lies for a perſon who has a right to lands or tenements, by virtue of any intail, ariſing from the ſtatute of Weſtm. 2 Ch. II.

This writ is of three kinds, *viz.* a deſcender, remainder, and reverter. Formedon in deſcender, lies where a tenant in tail infeoffs a ſtranger, or is diſſeiſed and dies, the heir may bring this writ to recover the land. Formedon in remainder, lies where a man gives lands, *&c.* to a perſon in tail, and for default of iſſue of his body, the remainder to another in tail: here if the tenant in tail die without iſſue, and a ſtranger abates and enters into the land, he in remainder ſhall have this writ. Formedon in reverter, lies where lands are intailed on certain perſons and their iſſue, with remainder over for want of iſſue, and on that remainder failing, then to revert to the donor and his heirs: in this caſe, if the tenant in tail dies without iſſue, and alſo he in remainder, the donor and his heirs, to whom the reverſion returns, may have this writ for the recovery of the eſtate, tho' the ſame be aliened, *&c.*

FORMERS, in gunnery, round pieces of wood, fitted to the diameter of the bore of a gun, chiefly uſed for making cartridges.

On theſe formers, the paper, parchment, or cotton, which is to make the cartridge, are rolled before it be ſewed.

FORMICA, the ANT, in zoology. See the article ANT.

FORMICA, in medicine, a callous ſort of wart, more uſually called myrmecia. See the article MYRMECIA.

FORMICA-LEO, the ANT-LION, or ANT-EATER, in zoology, an inſect ſo called from its devouring great numbers of ants. It is the caterpillar or worm of a fly much reſembling the libellæ, or dragon-flies.

The addreſs of this inſect in catching the ants, is admirable; it makes a hole of a conical or funnel-ſhape, in the looſe ſand; and is ſure to catch all the ants that come within the verge of this hole, by throwing up ſand on them, whereby they are forcibly carried into the power of the enemy at the bottom of the hole.

FORMICATION, a term uſed among builders for arching or vaulting.

FORMING *of a ſiege*, in the military art. See the article SIEGE.

FORMING, in grammar. See the article FORMATION.

FORMOSA, an iſland in the pacific ocean, between 119° and 122° of eaſt longitude, and between 22° and 25° north latitude, about 100 miles eaſt of Canton in China. It is ſubject to the Chineſe.

FORMULA, or FORMULARY, a rule or model, or certain terms preſcribed or decreed by authority, for the form and manner of an act, inſtrument, proceeding, or the like.

FORMULA, in church hiſtory and theology, ſignifies a profeſſion of faith. See the article FORM.

FORMULA, in medicine, imports the conſtitution of medicines, either ſimple or compound, both with reſpect to their preſcription and conſiſtence. Paracelſus calls red and clear urine, formula urinæ.

FORMULARY, a writing containing the form of an oath, declaration, atteſtation, abjuration, *&c.* to be made on certain occaſions.

FORNACALIA, or FORNICALIA, in roman antiquity, a feſtival inſtituted by Numa in honour of Fornax, the goddeſs of ovens; wherein certain cakes were made, and offered in ſacrifice before the ovens.

FORNAGE, *fornagium*, in our old writers, ſignifies the fee taken by a lord from his tenants, bound to bake in the lord's oven, or for a permiſſion to uſe their own: this was uſual in the northern parts of England.

FORNICATION, the act of incontinency between ſingle perſons; for when either of the parties is married, ſuch act is adultery. See the article ADULTERY.

The ſpiritual court now has the ſole cognizance of this offence which antiently was cognizable in other courts, as the court-leet, *&c.* in which the king had a fine aſſeſſed on the offenders.

FORNICATION is ſometimes alſo uſed as a generical term, including all kinds of offences againſt chaſtity.

FORNIX, in anatomy, a part of the brain placed under the ſeptum lucidum, and, like it, compoſed of a medullary ſubſtance. Its anterior part riſes with a double baſe, but the two parts ſoon unite: the hinder part is likewiſe bifid, and thence called crura fornicis, and by ſome, pedes hippocampi. See the article BRAIN.

FORPRISE, in law, ſignifies an exception or reſervation, and is frequently uſed in leaſes and conveyances, wherein any exception is inſerted; as ſuch a thing excepted and forpriſed.

FORRAGE, in the military art, denotes hay,

Fig. 1. FORE-STAFF.

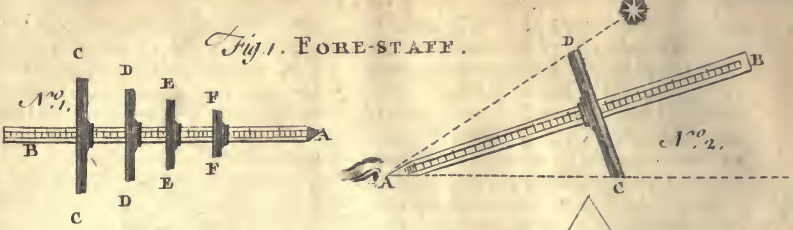


Fig. 2. FORTS.

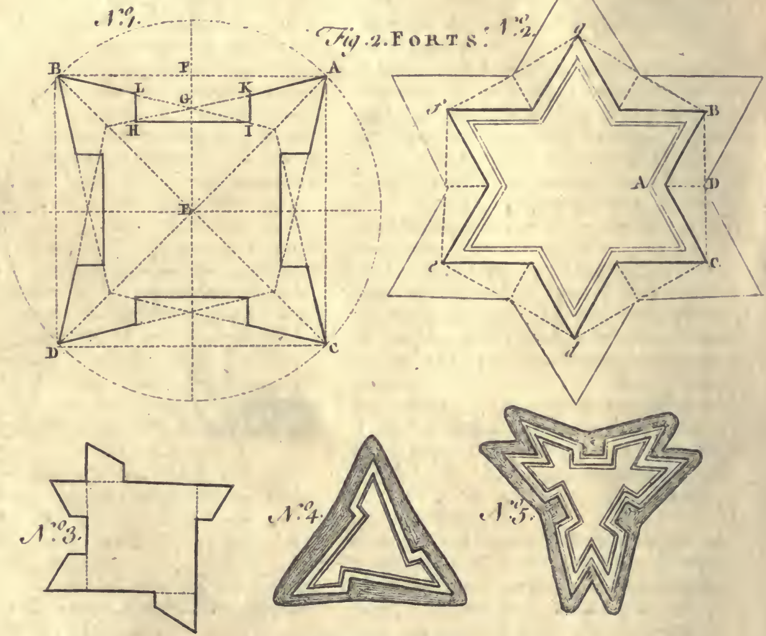
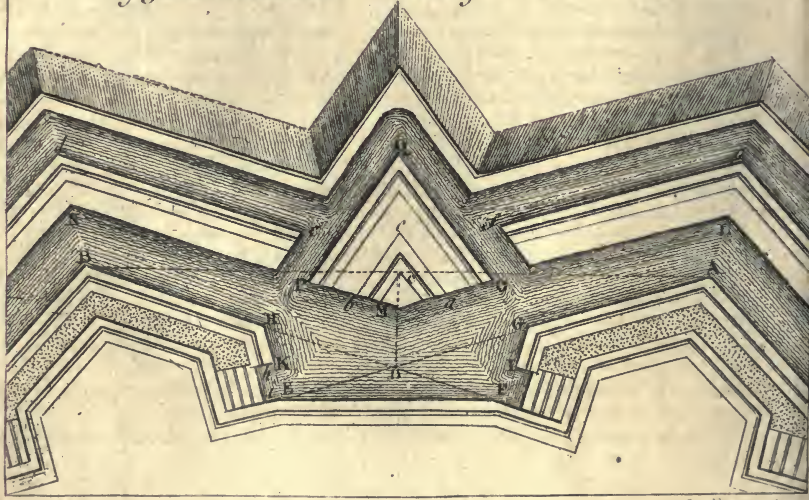


Fig. 3 FORTIFICATION, according to Count PAGAN.



T. Jefferys sculp.

hay, oats, barley, wheat, graſs, clover, *&c.* brought into the camp by the troopers, for the ſuſtenance of their horſes.

Dry forrage is the hay, oats, *&c.* delivered out of the magazines, to an army in garriſon, or when they take the field, before the green forrage is ſufficiently grown up to ſupply the troops.

It is the buſineſs of the quarter-maſter-general to appoint the method of forrage, and poſt proper guards for the ſecurity of the forragers. He ought alſo, in encamping an army, to take care that it be in a country abounding with forrage.

Ration of FORRAGE. See RATION.

FORRES, a parliament-town of Scotland, in the county of Murray, about thirteen miles weſt of Elgin: weſt long. 3° 20′, and north lat. 57° 40′.

It is claſſed with Inverneſs, Fortroſe, and Nairn. See the article BOROUGH.

FORSES, a name uſed in ſome parts of the kingdom for a cataract, or water-fall. See the article CATARACT.

FORSTALLING, in law. See the article FORESTALLING.

FORT, in the military art, a ſmall fortified place, environed on all ſides with a moat, rampart, and parapet. Its uſe is to ſecure ſome high ground or the paſſage of a river, to make good an advantageous poſt, to defend the lines and quarters of a ſiege, *&c.*

Forts are made of different figures and extents, according as the ground requires. Some are fortified with baſtions, others with demi-baſtions. Some again are in form of a ſquare, others of a pentagon. A fort differs from a citadel, as this laſt is built to command ſome town. See the article CITADEL.

Royal FORT, one whoſe line of defence is at leaſt twenty-ſix fathoms long.

To fortify a ſquare fort, having inſcribed the ſquare in a circle, 1. Divide each of its ſides AB, BD, *&c.* (plate CII. fig. 2. n° 1.) into two equal parts, in the point F. 2. From the center E, draw an indefinite line EF. 3. From the center draw alſo the lines EA, EB, ED, EC, to the angles of the ſquare. 4. Divide the ſide AB into eight equal parts. 5. Let one of theſe parts be laid off from F to G, and from G draw the lines of defence AG, BG. 6. Divide another ſide of the ſquare into ſeven equal parts. 7. Lay off two of theſe parts from A to K, and from B to L, which will be the faces of the baſtions. 8. Take the diſtance KL in your compaſſes, and lay it off the lines of defence from K to H, and from L to I; and drawing HI, it will be the curtin; and the lines KI, LH, will be the flanks. See another method of fortifying a ſquare, *ibid.* n° 3. Alſo two different methods of fortifying a triangle, *ibid.* n° 4 and 5.

Star-FORT, a redoubt formed by a number of re-entering and ſalient angles, the ſides of which flank each other. See plate CII. fig. 2. n° 2.

To deſcribe a ſtar-fort, 1. Draw an hexagon *a* B C *d e f*. 2. Divide one of its ſides B C into four equal parts. 3. Upon the middle of this ſide, raiſe the perpendicular D A, equal to $\frac{1}{4}$ of the ſide B C, from D to A. 4. From the point A, draw the faces A C, A B. Let the ſame operations be performed with reſpect to the other ſides of the hexagon, and you will have the ſtar-fort required.

FORTAMENTE, in muſic, the ſame with forte. See the article FORTE.

FORTAVENTURA, one of the Canary-iſlands, ſubject to Spain: weſt long. 14°, and north lat. 27°.

FORTE, or FORTAMENTE, in muſic, directs to play ſtrong and loud; and forte forte, or piu forte, ſignifies a degree louder and ſtronger than forte alone.

FORTIFICATION, the art of fortifying a town, or other place; or of putting them in ſuch a poſture of defence, that every one of its parts defends, and is defended by ſome other parts, by means of ramparts, parapets, moats, and other bulwarks; to the end, that a ſmall number of men within, may be able to defend themſelves for a conſiderable time againſt the aſſaults of a numerous army without; ſo that the enemy, in attacking them, muſt of neceſſity ſuffer great loſs.

Fortification is either ancient or modern, regular or irregular. Antient fortification, at firſt, conſiſted of walls or defences made of trunks, and other branches of trees, mixed with earth, to ſecure them againſt the attacks of the enemy. This was afterwards altered to ſtone-walls, on which were raiſed breaſt-works, behind which they made uſe of their darts and arrows in ſecurity. Modern fortification, is that which is flanked and defended by baſtions and out-works, the ramparts of which are ſo ſolid, that they cannot be beat down but by the continual fire of ſeveral batteries of cannon. Regular fortification, is that built in a regular polygon, the ſides and angles of which are all equal, being commonly about a muſket ſhot from each other. Irregular fortification, on the contrary, is that where the ſides and angles are not uniform, equidiſtant, or equal; which is owing to the irregularity of the ground, valleys, rivers, hills, and the like. See BASTION, &c.

The principal maxims of fortification are theſe: 1. That every part of the works be ſeen and defended by other parts, ſo that the enemy can lodge no where without being expoſed to the fire of the place. 2. A fortreſs ſhould command all places round it; and therefore all the out-works ought to be lower than the body of the place. 3. The works fartheſt from the center, ought always to be open to thoſe more near. 4. No line of defence ſhould exceed a point blank muſket-ſhot, which is about an hundred and twenty or an hundred and twenty-five fathoms. 5. The more acute the angle at the center is, the ſtronger will be the place. 6. In great places, dry trenches are preferable to thoſe filled with water, becauſe ſallies, retreats, and ſuccours are frequently neceſſary; but, in ſmall fortreſſes, water-trenches that cannot be drained, are beſt, as ſtanding in need of no ſallies, &c.

Different authors recommend different methods of fortification; but the principal are thoſe of Pagan, Blondel, Vauban, and Scheiter.

Fortification, according to the method of count Pagan, ſuppoſes the ſide A B (plate CII. fig. 3.) of the external polygon, in larger fortifications, 100 perches; in the ſmaller, 80; and in thoſe of middle ſize, 90; with the correſponding faces, 30, 25, and $27\frac{1}{2}$; the perpendicular, C D, being in all of them 15. Here too the flanks G F, H E, are perpendicular to the lines of defence, A E and B F: theſe flanks are alſo covered with an orillion and threefold. L M N is the boundary of the moat, parallel to the faces A G, B H. The curtin is defended by a double ravelin, O Q P being the external one, and *a c b* the internal; the faces of the baſtions being likewiſe defended by counter-guards *g f*, *e d*. This method, though received with great applauſe, is not without its defects. It is not only very expenſive, but its threefold flanks are too cloſe, ſo as to be too much expoſed to bombs; the largeneſs of the orillons is prejudicial to the length of the flanks, and the outer rampart is too thick.

Mr. Blondel's method of fortification has a great affinity with that of count Pagan, only that the lines and angles are otherwiſe determined. Thus by ſubſtracting a right angle from that of the polygon, and adding 15 to a third part of the remainder, you find the quantity of the diminiſhed angle A B E. In the greater fortifications, the ſide A B (plate CIII. fig. 1.) of the outer polygon is 100 perches, in the leſſer only 85; and A B being divided into ten equal parts, ſeven of them give the lines of defence A F, B E. The faces of the baſtions A G, B H, are equal to half thoſe of the tenaille A D, B D. In theſe faces is a kind of flanking batteries Q R, to defend the faces of the ravelin *e c d*. The flanks H F, G E, are threefold, as in count Pagan's method; and in the middle of the moat is a deep trench *a d b*. The other out-works are as repreſented in plate CIII. fig. 1.

Fortification, according to Vauban's method, ſuppoſes the outer polygon to be 100 perches in larger places, 80 in ſmaller ones, and 90 in thoſe of a middle ſize. The faces are made $\frac{2}{7}$ of the ſame, the perpendicular $\frac{1}{8}$ in a ſquare, $\frac{1}{7}$ in a pentagon, and $\frac{1}{6}$ in other polygons. He alſo makes the complement of the face to the line of defence, equal to the diſtance of the epaule; uſes re-entering crooked flanks, and places a low tenaille before the curtin. See plate CIII. fig. 2. n° 1.

This method of fortification is much cried up by many, both as it increaſes the ſtrength without much expence, and agrees very well with the maxims above laid down. Its greateſt fault lies in this, that the faces lie altogether expoſed to the enemy.

Vauban's new method places large baſtions before ſmall ones; the curtin being covered with a low tenaille and a double ravelin, *ibid.* n° 2.

Fortification, according to Scheiter's method, ſuppoſes the external ſide, A B, (plate CIII. fig. 3.) in large fortifications, 100 perches; in leſſer ones, 80; and in thoſe of middle ſize, 90. The flanks N O, P Q, are perpendicular to the lines of defence A Q, B O; which in greater fortifications are 70, in leſſer 60, and in thoſe of middle ſize, 65 perches: theſe detach the baſtions from the curtin, and form a kind of inner receſs behind the curtin. The angle of the baſtion in a ſquare, is 64°; in a penta-

gon,

Fig. 1. FORTIFICATION, according to Mr BLONDEL.

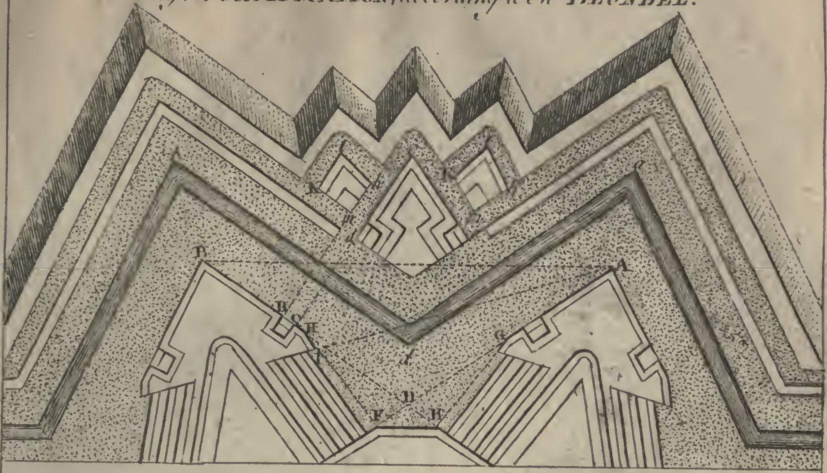


Fig. 2. Mr VAUBAN'S Method of FORTIFICATION.

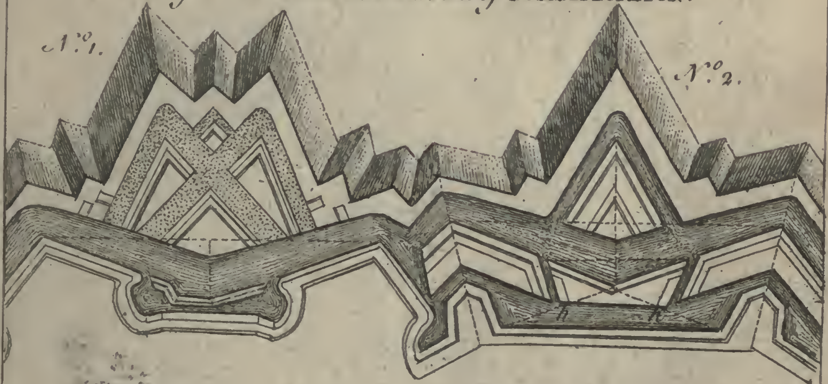
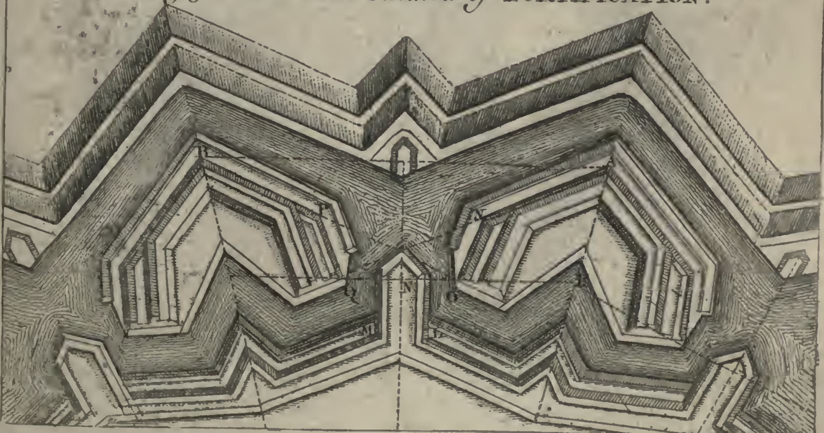


Fig. 3. SCHEITER'S Method of FORTIFICATION.



J. Jefferys sculp.

Fig. 1. Plan of a Regular FORTIFICATION.

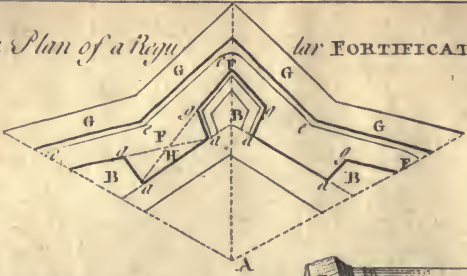


Fig 2 Profile of a Regular FORTIFICATION

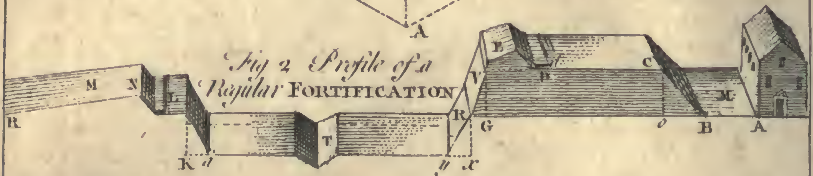
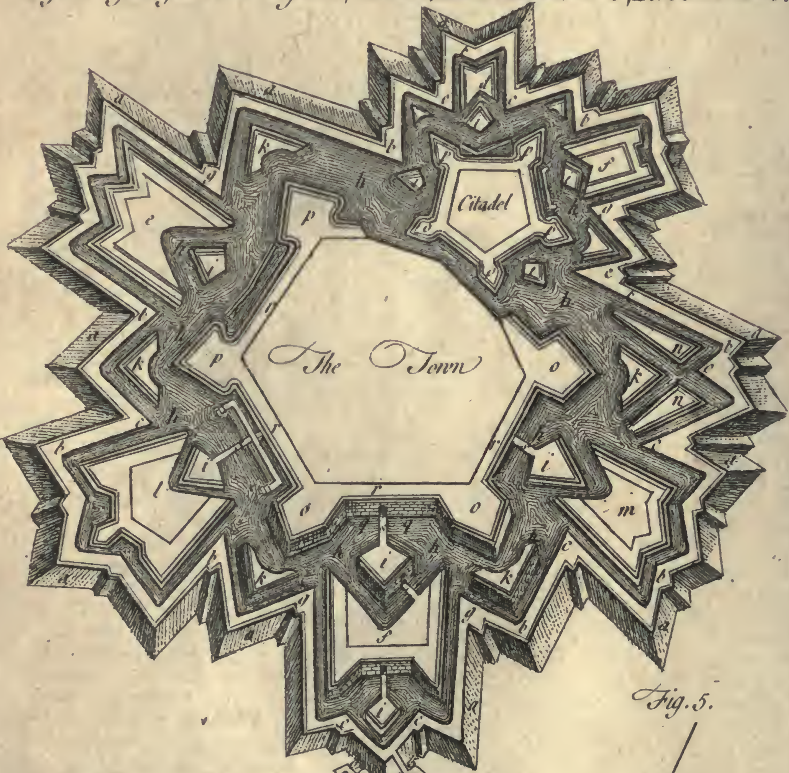


Fig 3. A fortified Hexagon & Citadel, with Outworks & APPROACHES.



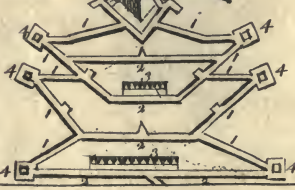


Fig. 4.

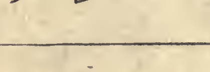


Fig. 5.

T. Jefferys sculp.

gon, 72°; in a hexagon, 78°; in a heptagon, 83°; and in works of more ſides, this angle is found by adding 2° for every ſide above the heptagon.

As to the out-works, they are much the ſame as in the preceding methods, only that the covert-way is double; as is the ravel, which covers the curtin.

To lay down the plan of a regular fortification. 1. Meaſure exactly the circuit of the place to be fortified, at about twelve paces diſtance from the houſes; and dividing the whole circuit by 150 geometrical paces at leaſt, or 180 at moſt, the quotient will give the number of the baſtions, in ſuch a manner that their lines of defence ſhall not exceed the carriage of a muſquet-ſhot. 2. Inſcribe in a circle a polygon with as many ſides as the place is to have baſtions; and from the center A (plate CIV. fig. 1.) through the angle B of the polygon, draw lines at pleaſure, which lines are called principals. Afterwards take B *a* = $\frac{1}{8}$ of the ſide of the polygon, and B F = $\frac{1}{5}$; then drawing the lines of defence F *g a*, F *g a*, from each point *a* raiſe perpendiculars; which meeting the lines of defence in the points *g*, *g*, will form the baſtions *ag* F *g a*, *a g* F, &c. 3. Having thus deſcribed the outward circuit of the rampart, draw lines *e*, *e*, *e*, parallel to the faces of the baſtions F *g*, F *g*, F *g*: theſe will determine the outward circuit of the moat, which ought to be rounded before the angles of the baſtions F, F. 4. To finiſh the plan, draw within the place lines parallel to thoſe which form the outward circuit of the rampart, at the diſtance of $\frac{1}{5}$ of the flank of the parapet; at the diſtance of $\frac{1}{2}$ the demigorge B *a*, for the rampart; and at the diſtance of five feet from the parapet, for the banquet. In the ſame manner, on the outſide of the moat, muſt be drawn lines parallel to its outward circuit, at the diſtance of $\frac{1}{4}$ of the flank for the covered way; and at the diſtance of $\frac{2}{3}$ of the flank for the glacis.

To lay down the profile of theſe works. Let A R R (plate CIV. fig. 2.) repreſent the level of the place; take A B, 5 paces, for the place of arms; the perpendicular O C, 16 feet, for the talus or ſlope; the thickneſs of the lower part of the rampart, B R, 12 paces; the upper part C D, 6$\frac{2}{3}$ paces; the banquet, *d* D, 6 feet; the thickneſs of the lower part of the parapet D V, 3$\frac{1}{3}$ paces; the upper, at E, 2$\frac{1}{3}$ paces; its inward height, E D, 6 feet; and its outward height, 5 feet; the talus of the rampart to the moat, G R, 7 feet; the talus of the ſcarp, *x y*, 2 paces; the depth of the moat, R *x*, 16 feet; the width of its channel, T, 15 feet; the talus of the counterſcarp, *a* K, 10 feet; and the banquet of the covered way, at L, 5 feet. Then follows the paliſade at N, and the glacis or eſplanade, M.

In plate CIV. fig. 3. is repreſented a hexagon fortified with all the kinds of out-works, together with the manner of carrying on the trenches of approach. Here is alſo delineated a pentagonal cittadel, with its out-works. The names of the different works and parts of this fortification, are theſe; *a*, *a*, *a*, &c. repreſent the declivity or ſlope, uſually called glacis; *b*, *b*, *b*, &c. the covert way; *c*, *c*, *c*, &c. the counterſcarp; *d*, a ſingle tenaille; *e*, a double tenaille; *f*, a horn-work; *g*, *g*, *g*, &c. places of arms; *h*, *h*, *h*, &c. the moat or ditch; *i*, *i*, *i*, &c. ravelins; *k*, *k*, *k*, &c. half moons; *l*, a crown-work; *m*, a bonnet or prieſt's cap; *n*, *n*, a counter-guard; *o*, *o*, *o*, &c. baſtions; *p*, *p*, *p*, baſtions with circular flanks; *q*, *q*, the curtin; *r*, *r*, *r*, &c. the ramparts; and *s*, *s*, *s*, &c. bridges over the moat. With reſpect to the approaches, 1, 1, 1, &c. repreſent the trenches; 2, 2, 2, &c. the lines of communication; 3, 3, 3, batteries; 4, 4, 4, &c. forts for the defence of the trenches; 5, the deſcent into the covered way; and 6, a mine.

Irregular FORTIFICATIONS are thoſe raiſed about irregular polygons; in which the engineer ought to follow, as much as poſſible, the proportions laid down for the regular ones. If baſtions are found too high to ſweep the circumjacent campaign, a ſecond baſtion muſt be added to the firſt, or even a third, if neceſſary; ſtill taking care that their faces may be well defended. If, on the contrary, a baſtion is too low, a cavalier muſt be raiſed on it. It will ſometimes alſo happen, that the faces of baſtions would become exceſſive long, if they were to be extended till they meet; in which caſe, they are uſually cloſed with a re-entering angle, *ibid.* fig. 4. When one ſide of the polygon is long enough to admit of a baſtion in its middle, it is remedied by raiſing one; but if it will not admit of this, it may be remedied by forming a ſalliant angle in the middle; or by advancing the neighbouring baſtions nearer to each other, ſo that both may be entirely formed upon that ſide. When a long extended ſide of a place cannot admit of baſtions, as being cut off by a river, or ſtands upon a deep aſcent, it may be fortified with redents or re-entering angles, not unlike the teeth of a ſaw. See plate CIV. fig. 5. But the defect of theſe redents is, that both the ſides of the tenaille or front of a place, may be ruined from one battery; ſo that the beſiegers may then make an aſſault without fear of being enfiladed.

Marine **FORTIFICATIONS.** Though theſe have nothing peculiar in them, yet it may not be improper to give ſome directions with relation to batteries. 1. In raiſing batteries to hinder a deſcent, care ſhould be taken to diſpoſe them in ſuch places where the deſcent is moſt eaſy; and the guns ſhould be ſo levelled, as to ſcour the ſurface of the water, that they may fire effectually upon the boats as they approach. 2. It is likewiſe convenient to have batteries to play upon places where there is good anchorage; and theſe ſhould be ſomewhat more elevated than the former. 3. It is alſo neceſſary to erect batteries at the entrance of roads; and theſe ought to be ſo made, as to diſcover ſhips at a diſtance. 4. It is very neceſſary that theſe batteries ſhould be defended, by ſome works, againſt attacks; and, if poſſible, ſhould be under the fire of the place; or at leaſt, they ought not to be too far advanced.

FORTIFIED, an appellation given to places defended by ramparts, baſtions, ditches, covert-ways, half-moons, ravelins, tenailles, and other out-works. See the articles RAMPART, BASTION, &c. and the preceding article.

FORTIN, FORTLET, or *field*-**FORT**, a ſconce or little fort, whoſe flanked angles are generally diſtant one from another 120 fathoms. See the article FORT.

The extent and figure of fortins are different, according to the ſituation or nature of the ground; ſome of them having whole baſtions, and others demi-baſtions. They are made uſe of only for a time, either to defend the lines of circumvallation, or to guard ſome paſſage or dangerous poſt.

FORTISSIMO, in muſic, ſometimes denoted by F F. F, or *f f f*, ſignifies to ſing or play very loud or ſtrong.

FORT-LEWIS, a fortreſs of Alſace, in Germany, ſituated on the weſtern ſhore of the Rhine, ſubject to France: eaſt long. 8°, and north lat. 48° 46′.

FORTUNA, in our antient law-books, is the ſame with what we call treaſure-trove. See the article TREASURE.

FORTUNA EQUESTRIS, in roman antiquity, a ſtatue of the goddeſs Fortune, mounted on horſeback in the middle of the city.

FORTUNATE-ISLANDS, in antient geography, certain iſlands concerning the ſituation of which authors are not agreed, famous for the golden apples of the Heſperides. See the article HESPERIDES.

The common opinion is, that they are the ſame with the Canary-iſlands. See the article CANARY.

FORTUNE, *fortuna*, a goddeſs worſhiped with great devotion by the antient Greeks and Romans, who believed her to preſide over human affairs, and to diſtribute wealth and honour at her pleaſure.

The Greeks had a great number of temples dedicated to Fortune, under the name of τυχη. The poet Pindar makes her one of the parcæ, or deſtinies, and the daughter of Jupiter. Ancus Martius, king of the Romans, was the firſt who built a temple at Rome to this deity, under the name of *fortuna virilis*, on account that courage, no leſs than good fortune, is requiſite to obtain a victory. Servius Tullus built a temple to fortune, under the name of primogenia. The Romans gave ſeveral other appellations to fortune, ſuch as fortuna libera, redux, publica, &c.

There was a ſtatue of Fortune at Athens, holding betwixt her arms Plutus the god of riches. Pauſanias ſays, that her moſt antient form was that which Bupalus made in Greece, in ſhape of a woman with a round ball on her head, and a cornucopia under her arm. Macrobius ſays, that ſhe was firſt ſet forth with wings on her ſhoulders, having by her ſide the rudder of a ſhip; and that ſhe was placed upon a wheel, and held in her right hand a golden ball, and in her left a whip. In Ægypt ſhe was painted like a woman, turning a great glaſs wheel, on whoſe top were repreſented a great number of men playing, others climbing up, and others, having attained the ſummit of the wheel, precipitating themſelves, and falling down again. Modern painters repreſent Fortune by a naked woman, ſtanding on a globe, with a bandage on her eyes.

Horace's deſcription of this goddeſs, and her great power, may be ſeen in ode xxxv. lib. I. Juvenal, in Satire x. v. 365. calls Fortune the deity of fools.

FORTY-SHILLING LAND, a certain quantity of arable land; that of old extent, containing eight ox-gang, or an hundred and four acres.

FORUM, in roman antiquity, a public ſtanding place within the city of Rome, where cauſes were judicially tried, and orations delivered to the people.

There were ſix of theſe forums, *viz.* the Romanum, Julianum, Auguſtum, Palladium, Trojanum, and Saluſtii forum. The firſt and moſt eminent of theſe was the forum Romanum, called abſolutely the Forum. In this was an apartment called the roſtra, where the lawyers pleaded, and the orators harangued the people, *&c.* Here was alſo the comitium, or hall of juſtice, with the ſanctuary of Saturn, the temple of Caſtor, *&c.* All the compaſs of the forum was arched with porticos, ſome paſſages being only left for places of entrance.

FORUM was alſo uſed for a place of traffic, anſwering to our market place: of theſe there were vaſt numbers, as the *forum piſcarium*, *olitorium*, &c. Theſe were generally called *fora venalia*, in contradiſtinction to the former, which were called *fora civilia.*

FORUM is alſo uſed, among caſuiſts, *&c.* for juriſdiction; thus they ſay, *In foro legis*, &c.

FOSS, or FOSSA, in anatomy, a kind of cavity in a bone, with a large aperture, but no exit or perforation.

FOSS is particularly uſed for the cavity, or indenture, in the back part of the neck.

FOSSA *magna*, the interior cavity, or rima magna, of the pudendum muliebre. Bartholin calls it foſſa navicularis. This cavity appears, upon opening the labia; it has the carunculæ myrtiformis in the middle of it. See the article CARUNCULÆ MYRTIFORMES.

FOSS, in fortification, a hollow place, commonly full of water, lying between the ſcarp and counterſcarp, below the rampart; and turning round a fortified place or a poſt, that is to be defended. See the article MOAT.

FOSSA, in our antient cuſtoms, was uſed to ſignify a ditch full of water, wherein women, convicted of felony, were drowned. See the article FURCA.

FOSS-WAY, one of the four principal highways of England, that antiently led through the kingdom; ſuppoſed to be made by the Romans, having a ditch upon one ſide thereof.

FOSSANO, a town of Piedmont, nineteen miles ſouth-eaſt of Turin.

FOSSARII, in antiquity, a ſort of officers in the eaſtern church, whoſe buſineſs it was to inter the dead.

St. Jerom aſſures us, that the rank of the foſſarii held the firſt place among the clerks: but he is to be underſtood of thoſe clerks only who had the direction and intendance of the interment of the devout. Some authors inſinuate, that the foſſarii were inſtituted in the time of the apoſtles.

FOSSATORUM *operatio*, ſignifies the foſs-work; or the ſervice of labouring performed by inhabitants, and adjoining tenants, for the repair and maintenance of the ditches round a city or town. The contribution towards this work was termed *Foſſagium.*

FOSSIGNY, a county in the dutchy of Savoy. See the article SAVOY.

FOSSIL, in natural hiſtory, denotes, in general, every thing dug out of the earth, whether they be natives thereof, as metals, ſtones, ſalts, earths, and other minerals; or extraneous, repoſited in the bowels of the earth by ſome extraordinary means, as earthquakes, the deluge, *&c.* See the articles METAL, STONE, *&c.*

Native foſſils, according to Dr. Hill, are ſubſtances found either buried in the earth, or lying on its ſurface, of a plain ſimple ſtructure, and ſhewing no ſigns of containing veſſels or circulating juices. Theſe are ſubdivided, by the ſame author, 1. Into foſſils naturally and eſſentially ſimple. Of theſe, ſome are neither inflammable, nor ſoluble in water, as ſimple earths, talcs, fibrariæ, gypſum, ſelenitæ, cryſtal, and ſpars; others, tho' uninflammable, are ſoluble in water, as all the ſimple ſalts; and others, on the contrary, are inflammable, but not ſoluble in water, as ſulphur, auripigmentum, zarnich, amber, amber-greaſe, gagates, aſphaltum, ampelites, lithanthrax, naphtha, and piſſaſphalta. 2. The ſecond general ſubdiviſion of foſſils comprehends all ſuch as are naturally compound, but unmetallic. Of theſe, ſome are neither inflammable, nor ſoluble in water, as compound earths, ſtones, ſeptariæ, ſiderochita, ſcrupi, ſemi-pellucid gems, lithidia, coniſſalæ, and pellucid gems; others are ſoluble in water, but not inflammable, as all the metallic ſalts; and, laſtly, ſome are inflammable, but not ſoluble in water, as the marcaſites, pyritæ, and phlogonia. 3. The third and laſt general diviſion of foſſils comprehends all the metallic ones; which are bodies naturally hard, remarkably heavy, and fuſible in fire. Of theſe, ſome are perfectly metallic, as being malleable when pure; ſuch are gold, lead, ſilver, copper, iron, and tin: others are imperfectly metallic, as not being malleable even in their pureſt ſtate, ſuch are antimony, biſmuth, cobalt, zinc, and quickſilver, or mercury. Of all which ſubſtances the reader will find a particular deſcription under their reſpective heads, EARTH, TALC, FIBRARIÆ, GYPSUM, *&c.*

Extraneous foſſils are bodies of the vegetable or animal kingdoms accidentally buried in the earth. Of the vegetable kingdom, there are principally three kinds, trees or parts of them, herbaceous plants, and corals; and of the animal kingdom there are four kinds, ſea-ſhells, the teeth or bony palates and bones of fiſhes, complete fiſhes, and the bones of land animals. See the articles TREE, WOOD, PLANT, SHELL, *&c.*

As to the reaſon why theſe extraneous foſſils come to be lodged in the bowels of the earth, the common opinion is, that this great change was effected by the univerſal deluge. See DELUGE.

FOSSOMBRONE, a city and biſhop's ſee of Italy, ten miles ſouth-eaſt of Urbino.

FOTHER, or FODDER, in mining. See the article FODDER.

FOVEA CORDIS, in anatomy, the pit of the heart, or rather of the ſtomach.

FOUGADE, or FOUGASSE, in the art of war, a little mine, about eight or ten feet wide, and ten or twelve deep, dug under ſome work or poſt, which is in danger of falling into the enemies hands; and charged with ſacks of powder, covered with ſtones, earth, and whatever elſe can make great deſtruction. It is ſet on fire like other mines, with a ſauciſſe.

FOUGIERES, a town of Britany, in France, thirty-five miles ſouth eaſt of St. Malo.

FOUL, or FOULE, in the ſea-language, is uſed when a ſhip has been long untrimmed, ſo that the graſs-weeds, or barnacles grow to her ſides under water. A rope is alſo foul when it is either tangled in itſelf, or hindered by another, ſo that it cannot run, or be over-hawled.

FOUL imports, alſo, the running of one ſhip againſt another. This happens ſometimes by the violence of the wind, and ſometimes by the careleſsneſs of the people on board, to ſhips in the ſame convoy, and to ſhips in port by means of others coming in. The damages occaſioned by running foul, are of the nature of thoſe in which both parties muſt bear a part. They are uſually made half to fall upon the ſufferer, and half upon the veſſel which did the injury: but in caſes where it is evidently the fault of the maſter of the veſſel, he alone is to bear the damage.

FOUL-WATER. A ſhip is ſaid to make foul-water, when being under ſail, ſhe comes into ſuch ſhoal-water, that tho' her keel do not touch the ground, yet it comes ſo near it, that the motion of the water under her, raiſes the mud from the bottom.

FOULNESS, in ſurgery, a term applied to wounds, where the fleſh is putrid, fungous, black or livid. Wounds muſt be well cleanſed before any attempts are made to heal them. For which intention the antients uſed honey, but the moderns apply a digeſtive ointment made of turpentine diſſolved in the yolk of an egg, and afterwards mixed with honey of roſes; but where this is not found ſtrong enough for the purpoſe, they ſubſtitute the egyptian ointment, mixed either with ſpirit of wine, or with the common digeſtive. To theſe digeſtive ointments, a ſmall quantity of aloes or myrrh may be added, and where more ſtrength is required, a ſmall quantity of red precipitate. The uſe of lime-water as a detergent is alſo known to be very beneficial, eſpecially if there be added to every pint of it, twenty or thirty grains of ſublimate, which from its known efficacy is called by the ſurgeons phagedenic-water. Applications of this kind are to be continued till the wound is intirely clean, and then it is to be healed with the common digeſtives. See the article WOUND.

FOUMART, a name uſed in ſome parts of the kingdom for the muſtela, or weaſel. See the article MUSTELA.

FOUNDATION, in architecture, is that part of a building which is under ground. See the article BUILDING.

Foundation, called by Daviler, *Fondation*, is the coffer or bed dug below the level of the ground to raiſe a building upon, in which ſenſe the foundation either goes to the whole area of the building, as when there are to be vaults, cellars, *&c.* or it is drawn in trenches, as when only walls are to be raiſed. The foundation, *Fondement*, according to the ſame author, is properly ſo much of the maſonry as reaches as high as the ſurface of the ground, and ought always to be proportioned to the load or weight of the building that it is to bear. Sometimes the foundation is maſſive, and continued under the whole building, as in the antique arches and aqueducts, and ſome amphitheatres; but it is more uſually in ſpaces or intervals, either to avoid expence, or becauſe the vacuities are at too great a diſtance, in which latter caſe they make uſe of inſulated pillars bound together by arches.

Palladio allows a ſixth part of the height of the whole building for the hollowing or under-digging, unleſs there be cellars under-ground, in which caſe he would have it ſomewhat lower, and as to thickneſs, double the width of a wall is no bad rule. Palladio alſo lays down ſeveral rules to know if the earth be firm enough for the foundation, by obſervations from the digging of wells, and the like; but the beſt way to diſcover the nature of the ſoil is to try it with an iron-crow, or elſe with a borer, ſuch as is uſed by well-diggers.

Foundations are either natural or artificial. Natural as when we build upon a rock, or very ſolid earth, in which caſe we need not ſeek for any further ſtrengthening; for theſe, without digging, or other artificial helps, are of themſelves fit to uphold the greateſt buildings. But if the ground be ſandy, or marſhy, or have lately been dug, recourſe muſt be had to art. If the ground be ſandy or marſhy, you muſt dig till you find ſound ground, and the beſt is that which requires moſt labour in cutting, and when wet, does not diſſolve into dirt. If the earth to be built upon is very ſoft, as in mooriſh grounds, lay good pieces of oak whoſe length muſt be about the breadth of the trench, or two feet longer than the breadth of the wall, acroſs the foundation, about two feet aſunder, and being well rammed down, lay long planks upon them, pinning or ſpiking down each plank to the pieces of oak on which it lies. But if the ground be very bad, let piles of oak of a diameter about one twelfth part of their length be drove down to reach the good ground, and placed as cloſe as one can ſtand by another; then ſpike down long planks upon them. And it muſt not be forgot to place the piles not only under the outer walls, but alſo under the inner walls that divide the building; for if theſe ſhould ſink, it would make the outer wall crack, and ſo ruin the whole building. If the ground be faulty here and there, let arches be turned over the faulty places, which will diſcharge them of the weight. As to the rules neceſſary to be obſerved in the ſubſtruction or artificial part of the foundation, they are theſe, 1. That the bottom of the trench be made exactly level. 2. That the loweſt ledge or row be all of ſtone (the broader the better) laid cloſe together. 3. That the breadth of the ground-work be at leaſt double that of the wall to be raiſed on it. However, the breadth may be regulated according to the goodneſs of the ground, and the weight of the intended edifice. 4. That the foundation be made to diminiſh as it riſes, taking care, however, that it do ſo equally on both ſides. 5. That you ought never to build on the ruins of an old foundation, unleſs well aſſured of its depth and ſtrength to bear the ſuperſtructure. 6. And laſtly, The ſtones in a foundation ſhould be laid as they naturally lie in the quarry, a precept generally obſerved by all good architects, becauſe they find the ſtones are ſubject to cleave that way of the grain that lay horizontally in the quarry. In ſome places, buildings near the water are founded on ſacks of wool laid like matraſſes, which being well preſſed and greaſy, will never give way, nor rot in the water.

Foundation of Bridges is laid after different manners. The firſt is by encloſing all round the ſpace of ground you would build upon, by dams made with piles ſet deep in the ground in double rows, well ſtrengthened and bound together with croſs pieces and cords, and filling the vacant ſpaces between them with chalk or other earthy matter. This being done, the water muſt be emptied out, and the foundation dug according to the quality of the ground, driving down piles, if it be neceſſary, upon which the walls of the foundation muſt be laid. But this method is only practicable in building on ſuch rivers, where the water is neither very rapid, nor very deep. The ſecond is done by laying the foundation on grate-work, rafts of ſtout oak well bound together, and made faſt at the ſurface of the water with cables or machines, and building upon them large quarters of ſtone, cramped together, and joined with good mortar, or cement, and afterwards letting them deſcend ſoftly by theſe cables and machines perpendicularly to the bottom of the water. This was the method practiſed in laying the foundation of Weſtminſter-Bridge, the grating being made at the bottom of a frame called by the French *Caiſſon*, the ſides of which were ſo contrived, that they might be taken off, after a pier was finiſhed. The third is by drawing off all, or the greateſt part of the water of the river into ſome other place; and this was done at London-Bridge, if we could believe Stow, who alleges, that during the time of building, the river was turned from Batterſea to Rotherhith: but this is not warranted. See further on this ſubject in Belidor's Archit. Hydraulique, Livre iv. ch. 11, and 12.

Foundation denotes alſo a donation or legacy either in money or lands, for the maintenance and ſupport of ſome community, hoſpital, ſchool, lecture, &c.

Foundation is alſo uſed figuratively for the eſtabliſhment of a city, empire, or the like.

FOUNDAY, in metallurgy, a term uſed by the workers at the iron-mines in many counties of England, for the ſpace of ſix days, in which time they contrive to make a determinate quantity of iron; ſo that they count their work by theſe foundays, or weeks.

FOUNDER, in a general ſenſe, the perſon who lays a foundation, or endows a church, ſchool, religious-houſe, or other charitable inſtitution. The founder of a church may preſerve to himſelf the right of patronage, or preſentation to the living.

Founder, alſo implies, an artiſt who caſts metals, in various forms, for different uſes, as guns, bells, ſtatues, printing characters, candleſticks, buckles, &c. whence they are denominated gun-founders, bell founders, figure-founders, letter-founders, founders of ſmall works, &c. See the article Foundery.

Founder, in glaſs-making, a term appropriated to the green glaſs, and is the perſon there, who in the ſame office in the white-glaſs making is called conciator. See the article Conciator.

Founder, in the ſea-language. A ſhip is ſaid to founder, when by an extraordinary leak, or by a great ſea breaking in upon her, ſhe is ſo filled with water, that ſhe cannot be freed of it; ſo that ſhe can neither veer nor ſteer, but lie like a log; and not being able to ſwim along, will at laſt ſink.

FOUNDERING, in the manege, a diſorder in horſes, whereof there are two kinds, *viz.* in the feet and in the cheſt.

Foundering in the feet is an univerſal rheumatiſm, or defluxion of humours upon the ſinews of a horſe's feet, which cauſes ſo great a ſtiffneſs in the hoofs, that the horſe has no ſenſe nor feeling of them.

This diſorder ariſes from hard riding; from great heats and colds; and is ſometimes occaſioned by watering a horſe when he is very hot, by which means, as the farriers term it, his greaſe is melted within him; alſo by wearing too ſtrait a ſhoe, or travelling upon hard ground.

The general methods of curing this diſtemper are, firſt to pare all the horſe's ſoles ſo thin, that you may ſee the quick: then bleed him well at every toe; ſtop the vein with tallow and roſin; and having tacked hollow ſhoes on his feet, ſtop them with bran, tar, and tallow, as boiling hot as may be; and this renew once in two days for a week together, after which let him have good exerciſe, &c. or, after he is pared thin, and let blood at his toes, ſtop his feet with cow's dung, kitchen-fee, tar, and ſoot, boiled together, and poured boiling-hot into them.

Foundering in the cheſt may proceed from crudities in the ſtomach, or other infirmities, obſtructing the paſſages of the lungs; and may be diſcovered by the horſe's not being able to bow his joints; and being once laid, he cannot riſe again; his legs ſwell, &c.

As a particular remedy for cheſt-foundering, take five or ſix pennyworth of oil of peter, and mingle it with an equal quantity of ale, or beer: then rub this mixture with your hand on the part affected; and cauſe a red hot fire-ſhovel to be held before it during the application.

FOUNDERY, or **Foundry**, the art of caſting all ſorts of metals into different forms. It likewiſe ſignifies the work-houſe, or ſmelting-hut, wherein theſe operations are performed.

Foundery *of ſmall-works, or caſting in ſand.* The ſand uſed for caſting ſmall-works, is, at firſt, of a pretty ſoft, yellowiſh, and clammy nature: but it being neceſſary to ſtrew charcoal duſt in the mould, it at length becomes of a quite black colour. This ſand is worked over and over, on a board, with a roller, and a ſort of knife; being placed over a trough to receive it, after it is by theſe means ſufficiently prepared.

This done, they take a wooden board of a length and breadth proportional to the things to be caſt, and putting a ledge round it, they fill it with ſand, a little moiſtened, to make it duly cohere. Then they take either wood or metal models of what they intend to caſt, and apply them ſo to the mould, and preſs them into the ſand, as to leave their impreſſion there. Along the middle of the mould is laid half a ſmall braſs-cylinder, as the chief canal for the metal to run through, when melted, into the models, or patterns; and from this chief canal are placed ſeveral others, which extend to each model or pattern placed in the frame. After this frame is finiſhed, they take out the patterns, by firſt looſening them all round, that the ſand may not give way.

Then they proceed to work the other half of the mould with the ſame patterns in juſt ſuch another frame, only that it has pins, which, entering into holes that correſpond to it in the other, make the two cavities of the pattern fall exactly on each other.

The frame thus moulded, is carried to the melter, who, after extending the chief canal of the counterpart, and adding the croſs canals to the ſeveral models in both, and ſtrewing mill-duſt over them, dries them in a kind of oven for that purpoſe.

Both parts of the mould being dry, they are joined together by means of the pins; and to prevent their giving way, by reaſon of the melted metal paſſing through the chief cylindrical canal, they are ſcrewed or wedged up like a kind of a preſs.

While the moulds are thus preparing, the metal is fuſing in a crucible of a ſize proportionate to the quantity of metal intended to be caſt.

Some of theſe ſmall work founder's furnaces are like a ſmith's forge; others ſtand a few feet under-ground for the more eaſily and ſafely taking out a weighty pot of metal; which is done by means of a circular tongs that graſps round the top of the crucible. When the metal is melted, the workman pours it through the chief canal of each mould, which conveys it to every diſtinct pattern. See the articles FLUX and FORGE.

When the moulds are cooliſh, the frames are unſcrewed, or unwedged, and the caſt work taken out of the ſand, which ſand is worked over again for other caſtings.

FOUNDERY *of ſtatues.* The caſting of ſtatues depends on the due preparation of the pit, the core, the wax, the outer mould, the inferior furnace to melt off the wax, and the upper to fuſe the metal. The pit is a hole dug in a dry place ſomething deeper than the intended figure, and made according to the prominence of certain parts thereof. The inſide of the pit is commonly lined with ſtone, or brick; or when the figure is very large, they ſometimes work on the ground, and raiſe a proper fence to reſiſt the impulſion of the melted metal.

The inner mould, or core, is a rude maſs to which is given the intended attitude and contours. It is raiſed on an iron-grate, ſtrong enough to ſuſtain it, and is ſtrengthened within by ſeveral bars of iron. It is generally made either of potter's clay, mixed with hair, and horſe-dung; or of plaſter of Paris mixed with brick-duſt. The uſe of the core is to ſupport the wax, the ſhell, and leſſen the weight of the metal. The iron-bars and the core are taken out of the braſs figure through an aperture left in it for that purpoſe, which is ſoldered up afterwards. It is neceſſary to leave ſome of the iron-bars of the core, that contribute to the ſteadineſs of the projecting part within the braſs figure.

The wax is a repreſentation of the intended ſtatue. If it be a piece of ſculpture, the wax ſhould be all of the ſculptor's own hand, who uſually forms it on the core; though it may be wrought ſeparately in cavities, moulded on a model, and afterwards arranged on the ribs of iron over the grate; filling the vacant ſpace in the middle with liquid plaſter and brick-duſt, whereby the inner core is proportioned as the ſculptor carries on the wax.

When the wax, which is the intended thickneſs of the metal is finiſhed, they fill ſmall waxen tubes perpendicular to it from top to bottom, to ſerve both as canals for the conveyance of the metal to all parts of the work; and as vent-holes, to give paſſage to the air, which would otherwiſe occaſion great diſorder, when the hot metal came to encompaſs it.

The work, being brought thus far, muſt be covered with its ſhell, which is a kind of cruſt laid over the wax, and which being of a ſoft matter, eaſily receives the impreſſion of every part, which is afterwards communicated to the metal upon its taking the place of the wax, between the ſhell and the mould. The matter of this outer mould is varied according as different layers are applied. The firſt is generally a compoſition of clay, and old white crucibles well ground and ſifted, and mixed up with water, to the conſiſtence of a colour fit for painting: accordingly they apply it with a pencil, laying it ſeven or eight times over, and letting it dry between whiles. For the ſecond impreſſion, they add horſe-dung and natural earth to the former compoſition. The third impreſſion is only horſe-dung and earth. Laſtly, the ſhell is finiſhed by laying on ſeveral more impreſſions of this laſt matter, made very thick with the hand.

The ſhell, thus finiſhed, is ſecured by ſeveral iron-girts, bound round it, at about half a foot diſtance from each other, and faſtened at the bottom to the grate under the ſtatue, and at top to a circle of iron where they all terminate.

If the ſtatue be ſo big that it would not be eaſy to move the moulds with ſafety, they muſt be wrought on the ſpot where it is to be caſt. This is performed two ways: in the firſt a ſquare hole is dug under ground, much bigger than the mould to be made therein, and its inſide lined with walls of free-ſtone, or brick. At the bottom is made a hole of the ſame materials with a kind of furnace, having its aperture outwards: in this is a fire made to dry the mould, and afterwards melt the wax. Over this furnace is placed the grate, and upon this the mould, &c. formed as above. Laſtly, at one of the edges of the ſquare pit, is made another large furnace to melt the metal. In the other way, it is ſufficient to work the mould above ground, but with the like precaution of a furnace and grate underneath. When finiſhed, four walls are to be run around it, and by the ſide thereof, a maſſive made for a melting furnace. For the reſt, the method is the ſame in both. The mould being finiſhed, and incloſed as deſcribed, whether under ground or above it, a moderate fire is lighted in the furnace under it, and the whole covered with planks, that the wax may melt gently down, and run out at pipes contrived for that purpoſe, at the foot of the mould, which are afterwards exactly cloſed with earth, ſo ſoon as the wax is carried off. This done, the hole is filled up with bricks thrown in it at random, and the fire in the furnace augmented, till ſuch time as both the bricks and mould become red hot. After this, the fire being extinguiſhed, and every thing cold again, they take out the bricks and fill up their place with earth, moiſtened, and a little beaten to the top of the mould, in order to make it the more firm and ſteady. Theſe preparatory meaſures being duly taken, there remains nothing but to melt the metal, and run it into the mould. This is the office of the furnace above deſcribed, which is commonly made in the form of an oven with three apertures, one to put in the wood, another for a vent, and a third to run the metal out at. From this laſt aperture, which is kept very cloſe, while the metal is in fuſion, a ſmall tube is laid, whereby the melted metal is conveyed into a large earthen baſon, over the mould, into the bottom of which all the big branches of the jets, or caſts, which are to convey the metal into all the parts of the mould, are inſerted.

Theſe caſts, or jets, are all terminated with a kind of plugs, which are kept cloſe, that, upon opening the furnace, the braſs, which guſhes out with violence, may not enter any of them, till the baſon be full enough of matter to run into them all at once. Upon which occaſion, they pull out the plugs, which are long iron-rods with a head at one end, capable of filling the whole diameter of each tube. The whole of the furnace is opened with a long piece of iron fitted at the end of each pole, and the mould filled in an inſtant. This completes the work in relation to the caſting part; the reſt being the ſculptor's or carver's buſineſs, who taking the figure out of the mould, and earth, wherewith it is encompaſſed, ſaws off the jets with which it appears covered over, and repairs it with chiſſels, gravers, puncheons, &c.

Foundery of Bells. The metal, it is to be obſerved, is different for bells, from what it is for ſtatues; there being no tin in the ſtatue-metal: but there is a fifth, and ſometimes more, in the bell-metal. See the article BELL.

The dimenſions of the core, and the wax, for bells, if a ring of bells eſpecially, are not left to chance, but muſt be meaſured on a ſcale, or diapaſon, which gives the height, aperture, and thickneſs neceſſary for the ſeveral tones required. See the article DIAPASON.

It is on the wax that the ſeveral mouldings and other ornaments are formed to be repreſented in relievo, on the outſide of the bell.

The buſineſs of bell-foundery is reducible to three particulars. 1. The proportion of a bell. 2. The forming of the mould; and, 3. The melting of the metal.

The proportions of our bells differ much from thoſe of the Chineſe: in ours the modern proportions are to make the diameter fifteen times the thickneſs of the brim, and twelve times the height.

There are two kinds of preparations, *viz.* the ſimple and the relative: the former are thoſe proportions only that are between the ſeveral parts of a bell, to render it ſonorous; the relative proportions eſtabliſh a requiſite harmony between ſeveral bells.

The particulars neceſſary for making the mould of a bell, are, 1. The earth: the moſt coheſive is the beſt: it muſt be well ground and ſifted, to prevent any chinks. 2. Brick-ſtone; which muſt be uſed for the mine, mould, or core, and for the furnace. 3. Horſe dung, hair, and hemp, mixed with the earth, to render the cement more binding. 4. The wax for inſcriptions, coats of arms, &c. 5. The tallow equally mixed with the wax, in order to put a ſlight lay of it upon the outer mould, before any letters are applied to it. 6. The coals to dry the mould.

For making the mould, they have a ſcaffold conſiſting of four boards, ranged upon treſſels. Upon this, they carry the earth, groſsly diluted, to mix it with horſe-dung, beating the whole with a large ſpatula.

The compaſſes of conſtruction is the chief inſtrument for making the mould, which conſiſt of two different legs, joined by a third piece. And laſt of all, the founders ſhelves, on which are the engravings of the letters, cartridges, coats of arms, &c.

They firſt dig a hole, of a ſufficient depth to contain the mould of the bell, together with the caſe, or cannon, under ground; and about ſix inches lower than the terreplain, where the work is performed. The hole muſt be wide enough for a free paſſage between the mould and walls of the hole; or between one mould and another, when ſeveral bells are to be caſt. At the center of the hole is a ſtake erected, that is ſtrongly faſtened in the ground. This ſupports an iron-peg, on which the pivot of the ſecond branch of the compaſſes turns. The ſtake is encompaſſed with a ſolid brick-work, perfectly round, about half a foot high, and of the propoſed bell's diameter. This they call a mill ſtone. The parts of the mould are the core, the model of the bell, and the ſhell. When the outer ſurface of the core is formed, they begin to raiſe the core, which is made of bricks that are laid in courſes of equal height upon a lay of plain earth. At the laying each brick, they bring near it the branch of the compaſſes, on which the curve of the core is ſhaped, ſo as that there may remain between it and the curve the diſtance of a line, to be afterwards filled up with layers of cement. The work is continued to the top, only leaving an opening for the coals to bake the core. This work is covered with a layer of cement, made of earth and horſe-dung, on which they move the compaſſes of conſtruction, to make it of an even ſmoothneſs every where.

The firſt layer being finiſhed, they put the fire to the core, by filling it half with coals, through an opening that is kept ſhut, during the baking, with a cake of earth, that has been ſeparately baked. The firſt fire conſumes the ſtake, and the fire is left in the core half, or, ſometimes, a whole day: the firſt layer being thoroughly dry, they cover it with a ſecond, third, and fourth; each being ſmoothed by the board of the compaſſes, and thoroughly dried before they proceed to another.

The core being completed, they take the compaſſes to pieces, with intent to cut off the thickneſs of the model, and the compaſſes are immediately put in their place, to begin a ſecond piece of the mould. It conſiſts of a mixture of earth and hair, applied with the hand on the core, in ſeveral cakes that cloſe together. This work is finiſhed by ſeveral layers of a thinner cement of the ſame matter, ſmoothed by the compaſſes, and thoroughly dried, before another is laid on. The firſt layer of the model is a mixture of wax and greaſe ſpread over the whole. After which are applied the inſcriptions, coats of arms, &c. beſmeared with a pencil dipped in a veſſel of wax in a chaffing-diſh; this is done for every letter. Before the ſhell is begun, the compaſſes are taken to pieces, to cut off all the wood that fills the place of the thickneſs to be given to the ſhell.

The firſt layer is the ſame earth with the reſt, ſifted very fine; whilſt it is tempering in water, it is mixed with cow's hair, to make it cohere. The whole being a thin cullis, is gently poured on the model, that fills exactly all the ſinuoſities of the figures, &c. and this is repeated till the whole is two lines thick over the model. When this layer is thoroughly dried, they cover it with a ſecond of the ſame matter, but ſomething thicker: when this ſecond layer becomes of ſome conſiſtence, they apply the compaſſes again, and light a fire in the core, ſo as to melt off the wax of the inſcriptions, &c.

After this, they go on with other layers of the ſhell, by means of the compaſſes. Here they add to the cow's hair a quantity of hemp, ſpread upon the layers, and afterwards ſmoothed by the board of the compaſſes. The thickneſs of the ſhell comes to four or five inches lower than the mill-ſtone before obſerved, and ſurrounds it quite cloſe, which prevents the extravaſation of the metal. The wax ſhould be taken out before the melting of the metal.

The ear of the bell requires a ſeparate work, which is done during the drying of the ſeveral incruſtations of the cement. It has ſeven rings, the ſeventh is called the bridge, and unites the others, being a perpendicular ſupport to ſtrengthen the curves. It has an aperture at the top, to admit a large iron-peg, bent at the bottom; and this is introduced into two holes in the beam, faſtened with two ſtrong iron-keys. There are models made of the rings, with maſſes of beaten earth, that are dried in the fire, in order to have the hollow of them. Theſe rings are gently preſſed upon a layer of earth and cow's hair, one half of its depth; and then taken out, without breaking the mould. This operation is repeated twelve times for twelve half-moulds, that two and two united may make the hollows of the ſix rings; the ſame they do for the hollow of the bridge, and bake them all, to unite them together.

Upon the open place left for the coals to be put in, are placed the rings that conſtitute the ear. They firſt put into this open place the iron-ring to ſupport the clapper of the bell; then they make a round cake of clay, to fill up the diameter of the thickneſs of the core. This cake, after baking, is clapped upon the opening, and ſoldered with a thin mortar ſpread over it, which binds the cover cloſe to the core.

The hollow of the model is filled with an earth, ſufficiently moiſt, to fix on the place, which is ſtrewed, at ſeveral times, upon the cover of the core; and they beat it gently with a peſtle, to a proper height; and a workman ſmooths the earth at top with a wooden trowel dipped in water.

Upon this cover, to be taken off afterwards, they aſſemble the hollows of the rings. When every thing is in its proper place, they ſtrengthen the outſides of the hollows with mortar, in order to bind them with the bridge, and keep them ſteady at the bottom, by means of a cake of the ſame mortar, which fills up the whole aperture of the ſhell. This they let dry, that it may be removed without breaking. To make room for the metal they pull off the hollows of the rings, through which the metal is to paſs, before it enters into the vacuity of the mould. The ſhell being unloaded of its ear, they range under the mill-ſtone five or ſix pieces of wood, about two feet long, and thick enough to reach almoſt the lower part of the ſhell; between theſe and the mould they drive in wooden wedges with a mallet, to ſhake the ſhell of the model whereon it reſts, ſo as to be pulled up, and got out of the pit.

When this and the wax are removed, they break the model and the layer of earth, through which the metal muſt run, from the hollow of the rings, between the bell and the core. They ſmoke the inſide of the ſhell, by burning ſtraw under it, that helps to ſmooth the ſurface of the bell. Then they put the ſhell in the place, ſo as to leave the ſame interval between that and the core; and before the hollows of the rings or the cap are put on again, they add two vents, that are united to the rings, and to each other, by a maſs of baked cement. After which they put on this maſs of the cap, the rings, and the vent, over the ſhell, and ſolder it with thin cement, which is dried gradually by covering it with burning coals. Then they fill up the pit with earth, beating it ſtrongly all the time, round the mould.

The furnace has a place for the fire, and another for the metal. The fire-place has a large chimney with a ſpacious aſh-hole. The furnace which contains the metal, is vaulted, whoſe bottom is made of earth, rammed down; the reſt is built with brick. It has four apertures; the firſt, through which the flame reverberates; the ſecond is cloſed with a ſtopple that is opened for the metal to run; the others are to ſeparate the droſs, or ſcoriæ, of the metal by wooden rakes: through theſe laſt apertures paſſes the thick ſmoke. The ground of the furnace is built ſloping, for the metal to run down.

FOUNDERY *of great guns and mortar pieces.* The method of caſting theſe pieces is little different from that of bells: they are run maſſy, without any core, being determined by the hollow of the ſhell; and they are afterwards bored with a ſteel trepan, that is worked either by horſes, or a water-mill.

For the metal, parts, proportions, *&c.* of theſe pieces, ſee CANNON.

Letter FOUNDERY, or *Caſting of printing letters.* The firſt thing requiſite is to prepare good ſteel-punches, on the face of which is drawn the exact ſhape of the letter with pen and ink, if the letter be large, or with a ſmooth blunted point of a needle, if ſmall; and then, with proper gravers, the cutter digs deep between the ſtrokes, letting the marks ſtand on the punch; the work of hollowing being generally regulated by the depth of the counter-punch: then he files the outſide, till it is fit for the matrice.

They have a mould to juſtify the matrices by, which conſiſts of an upper and under part, both which are alike, except the ſtool and ſpring behind, and a ſmall roundiſh wire in the upper part, for making the nick in the ſhank of the letter. Theſe two parts are exactly fitted into each other, being a male and female gage, to ſlide backwards and forwards. See the article GAGE.

Then they juſtify the mould, by caſting about twenty ſamples of letters, which are ſet in a compoſing-ſtick, with the nicks towards the right hand; and comparing theſe every way with the pattern-letters, ſet up in the ſame manner, they find the exact meaſure of the body to be caſt.

Next they prepare the matrix, which is of braſs or copper, an inch and a half long, and of a proportionable thickneſs to the ſize of the letter it is to contain. In this metal is ſunk the face of the letter, by ſtriking the letter-punch the depth of an *n*. After this, the ſides and face of the matrice are juſtified, and cleared, with files, of all bunchings that have been made by ſinking the punch.

Then it is brought to the furnace, which is built upright of brick with four ſquare ſides, and a ſtone at top, in which is a hole for the pan to ſtand in. They have ſeveral of theſe furnaces. See the article FURNACE.

Printing-letters are made of lead, hardened with iron or ſtub-nails. To make the iron run, they mingle an equal weight of antimony, beaten ſmall in an iron mortar, and ſtub-nails together. They charge a proper number of earthen pots, that bear the fire, with the two ingredients, as full as they can hold, and melt it in an open furnace, built for that purpoſe. See the article FLUX.

When it bubbles, the iron is then melted, but it evaporates very much. This melted compoſt is ladled into an iron-pot, wherein is melted lead, that is fixed on a furnace cloſe to the former, 3 ℔ of melted iron to 25 ℔ of lead; this they incorporate according to art.

The caſter taking the pan off the ſtone, and having kindled a good fire, he ſets the pan in again, and metal in it to melt. If it be a ſmall-bodied letter, or a thin letter with great bodies, that he intends to caſt, his metal muſt be very hot, and ſometimes red hot, to make the letter come. Then taking a ladle, of which he has ſeveral ſorts, that will hold as much as will make the letter and break, he lays it at the hole where the flame burſts out; then he ties a thin leather, cut with its narrow end againſt the face, to the leather groove of the matrice, by whipping a brown thread twice about the leather groove, and faſtening the thread with a knot. Then he puts both pieces of the mould together, and the matrice into the matrice-cheek; and places the foot of the matrice on the ſtool of the mould, and the broad end of the leather on the wood of the upper haſt of the mould, but not tight up, leſt it hinder the foot of the matrice from ſinking cloſe down upon the ſtool, in a train of work.

After-

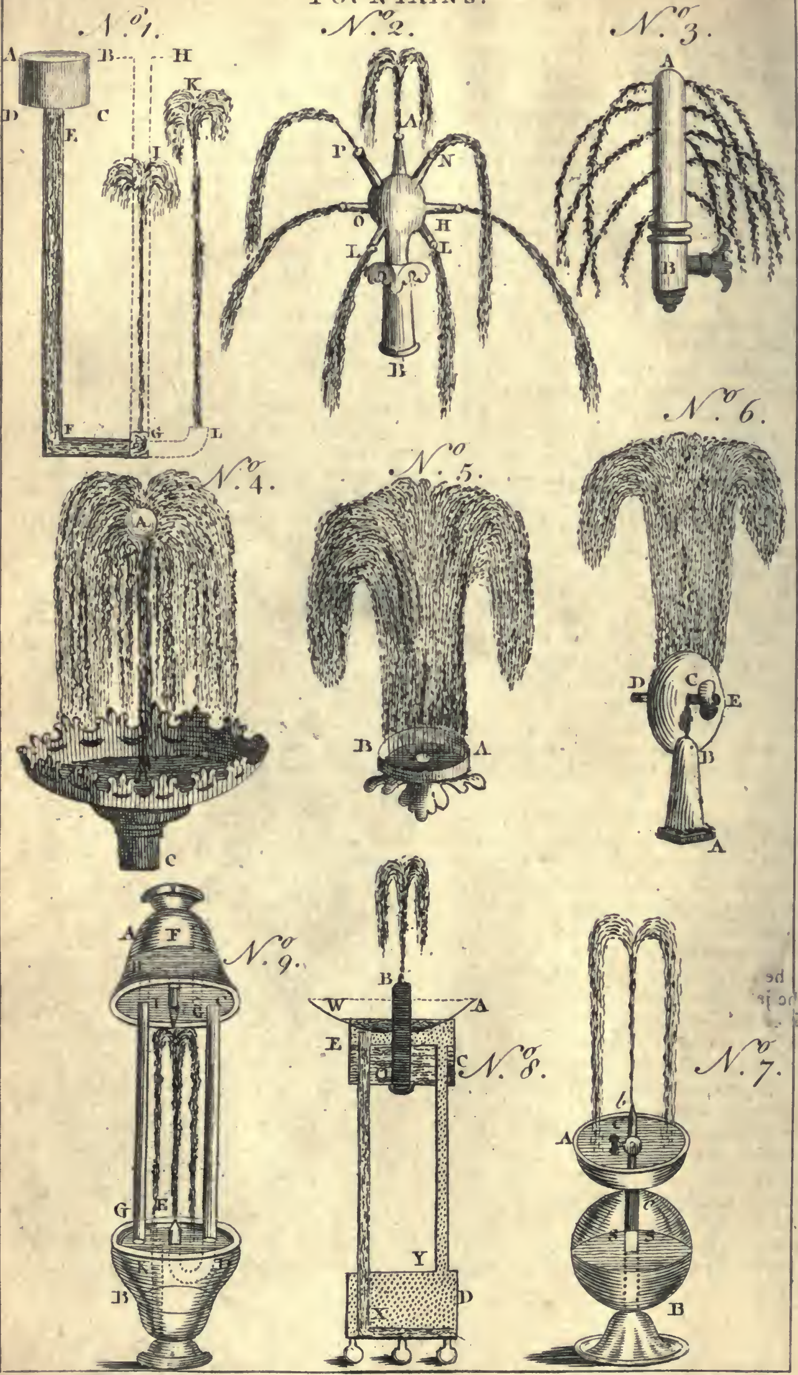
Afterwards laying a little roſin on the upper part of the mould, and having his caſting-ladle hot, he, with the bolling ſide, melts the roſin and preſſes the broad end of the leather hard down on the wood and ſo faſtens it thereto. Now he comes to caſting, when placing the under half of the mould in his left hand, with the hook or jag forward, he holds the ends of its wood between the lower part of the ball of his thumb and his three hinder fingers; then he lays the upper half of the mould upon the under half, ſo as the male gages may fall into the female; and, at the ſame time, the foot of the matrice places itſelf upon the ſtool, and claſping his left hand thumb ſtrongly over the upper half, he nimbly catches hold of the bow or ſpring, with his right hand fingers at the top of it, and his thumb under it, and places the point of it againſt the middle of the notch in the backſide of the matrice, preſſing it forwards as well towards the mould, as downwards, by the ſhoulder of the notch, cloſe upon the ſtool, while at the ſame time with his hinder fingers, as aforeſaid, he draws the under half of the mould towards the ball of his thumb, and thruſts, by the ball of his thumb, the upper part towards his fingers, that both the regiſters of the mould may preſs againſt both ſides of the matrice, and his thumb and fingers preſs both ſides of the mould cloſe together.

Then he takes the handle of his ladle in his right hand, and with the ball of it gives two or three ſtrokes outwards upon the ſurface of the melted metal, to clear it of the ſcum; then he takes up the ladle full, and having the mould in the left hand, turns his left ſide a little from the furnace, and brings the geat of his ladle to the mouth of the mould; and turns the upper part of his right hand towards him, to pour the metal into it, while, at the ſame inſtant, he puts the mould in his left hand forwards, to receive the metal with a ſtrong ſhake, not only into the bodies of the mould, but, while the metal is yet hot, into the very face of the matrice, to receive its perfect form there as well as in the ſhank. Then he takes the upper half of the mould off, by placing his right thumb on the end of the wood next his left thumb, and his two middle fingers at the other end of the wood: he toſſes the letter, break and all, out upon a ſheet of waſte paper, laid on a bench, a little beyond his left hand; and then is ready to caſt another letter, as before, and likewiſe the whole number in that matrix.

Then, boys, commonly employed for this purpoſe, ſeparate the breaks from the ſhanks, and rub them on a ſtone, and afterwards a man cuts them all of an even height, which finiſhes the fount for the uſe of the printer. See the next article. A workman will ordinarily caſt 3000 of theſe letters in a day. The perfection of letters thus caſt, conſiſts in their being all ſeverally ſquare and ſtraight on every ſide; and all generally of the ſame height, and evenly lined, without ſtooping one way or other; neither too big in the foot, nor the head; well grooved, ſo as the two extremes of the foot contain half the body of the letter; and well ground, barbed, and ſcraped, with a ſenſible notch, *&c.* See the article PRINTING.

FOUNT, or FONT, among printers, a ſet or quantity of letters, and all the appendages belonging thereto, as numeral characters, quadrates, points, *&c.* caſt by a letter-founder, and ſorted. Founts are large or ſmall, according to the demand of the printer, who orders them by the hundred weight, or by ſheets. When a printer orders a fount of five hundred, he means that the fount, conſiſting of letters, points, ſpaces, quadrates, *&c.* ſhall weigh 500 ℔. When he demands a fount of ten ſheets, it is underſtood, that with that fount he ſhall be able to compoſe ten ſheets, or twenty forms, without being obliged to diſtribute. The founder takes his meaſures accordingly; he reckons 120 ℔. for a ſheet, including the quadrates, *&c.* or 60 ℔. for a form, which is only half a ſheet: not that the ſheet always weighs 120 ℔. or the form 60 ℔. on the contrary, it varies according to the ſize of the form; beſides, it is always ſuppoſed that there are letters left in the caſes. As therefore every ſheet does not comprehend the ſame number of letters, nor the ſame ſort of letters, we muſt obſerve, that, as in every language ſome ſounds recur more frequently than others, ſome letters will be in much more uſe, and oftener repeated than others, and conſequently their cells or caſes ſhould be better ſtored than thoſe of the letters which do not recur ſo frequently: thus, a fount does not contain an equal number of *a* and *b*, or of *b* and *c*, *&c.* the letter-founders have therefore a liſt or tariff, or, as the French

FOUNTAINS.



T. Jeffery sculp

call it, a *police*, by which they regulate the proportions between the different ſorts of characters that compoſe a fount; and it is evident that this tariff will vary in different languages, but will remain the ſame for all ſorts of characters employed in the ſame language.

FOUNTAIN, *fons*, in philoſophy, a ſpring or ſource of water riſing out of the earth. Among the antients, fountains were held ſacred, and even worſhipped as a kind of divinities. For the phænomena, theory, and origin of fountains or ſprings, ſee the article SPRING.

FOUNTAIN, or *Artificial* FOUNTAIN, in hydraulics, called alſo a *jet d'eau*, is a contrivance by which water is violently ſpouted upwards.

The theory of fountains, in regard to the action of the ſeveral parts of a fluid upon each other, depends on the following principles. It has been ſhewn, under the article FLUID, that water coming from a reſervoir, as A B C D (plate CV. nº 1.) through the pipe E F G H, will riſe from the loweſt part, G, to the ſame altitude H, in the part G H, as is upon a level with the ſurface of the water A B, in the reſervoir: and alſo, that it thus roſe from the point G, by a force of preſſure proportional to the altitude of the water in the reſervoir, which is equal to the altitude G H. Now it is very evident that the tube G H itſelf can contribute nothing towards the waters riſing in it; on the contrary it rather impedes the aſcent, by the friction it occaſions to the particles which move againſt the internal ſurface thereof. Therefore, if the part G H be taken away, the water would riſe to the ſame height H, excepting ſo far as it is obſtructed by other concurring incidents; for in all fountains the height G I is ſomewhat leſs than G H, the height of the tube for the following reaſons: 1. The air's reſiſtance is an obſtruction to the jet, and diminiſhes its height; and ſince we know that the reſiſtance of fluids is proportional to the ſquares of the velocity, and the deficiency of the height H I is proportional to the reſiſtance; therefore a jet that plays with a double velocity, will have that deficiency four times as great; and with three times the velocity, nine times as great, and ſo on. 2. The ſecond impediment is the friction againſt the ſides of the hole, and the adjutage at G; and ſince this is in proportion to the quantity of ſurface in the hole, it will be greater in a ſmall hole than in a great one, in reſpect to the body of the ſpouting water; becauſe the jet will increaſe in magnitude with the ſquare of the diameter of the hole, whereas the reſiſtance will increaſe only with the diameter ſimply: or, a hole with twice the diameter emits four times the water, and gives but twice the reſiſtance: this makes a ſmall jet riſe to leſs height than a large one from the ſame fountain. 3. A third impediment ariſes from hence, that ſince all the particles ſet out from G, with an equal velocity, and this velocity is continually diminiſhing, it follows, that the velocity of the inferior parts is greater than the velocity of the parts above them, and therefore muſt in ſome degree ſtrike againſt them: by which impulſe, ſince fluids move every way, the particles will be urged ſide-ways, and the column of the jet become wider, and conſequently ſhorter than it would otherwiſe be. 4. The fourth cauſe why jets do not riſe to the height of the reſervoirs, is becauſe the water upon the top of the jet does not immediately run off, but ſpreading into a head, lies with its weight upon the aſcending water below, and hinders it from riſing ſo high as it would otherwiſe do: this will appear by inclining the jet a little, that the upper water may not bear upon the riſing ſtream; for the jet will then play higher, but be leſs beautiful.

If the hole of the adjutage G be leſs than a quarter of an inch in diameter, the force of the attraction of coheſion will extend itſelf through the body of the jet at the hole, and greatly obſtruct its aſcent: whence all jets of larger fountains, ſuch as are in gentlemen's gardens, ought to exceed a quarter of an inch in diameter, and that in proportion to the height of the reſervoir.

And one thing more is neceſſary to be known, that the jet may play the higheſt poſſible, *viz.* that the part of the conduit pipe at the adjutage, does not turn up at right angles, but with a gentle eaſy curve; that is, not as at G, but as at L, where the jet plays to a greater height at K: the upright part at G directly reſiſts the water coming from F, whereas the curve at L cauſes the impulſe of the water againſt it to be oblique; and therefore a leſs part of its momentum will be deſtroyed, and conſequently the greater remaining force will throw the jet the higher.

A Table of the height to which jets will riſe, in feet and decimal parts, from reſervoirs on an height of five feet to an hundred and fifty feet.

Ref.	Jet.	Ref.	Jet.	Ref.	Jet.	Ref.	Jet.
5	4,91	31	28,32	57	48,99	83	67,71
6	5,88	32	29,16	58	49,74	84	68,40
7	6,84	33	30,00	59	50,49	85	69,08
8	7,80	34	30,83	60	51,24	86	69,76
9	8,74	35	31,63	61	51,99	87	70,47
10	9,68	36	32,47	62	52,73	88	71,14
11	10,62	37	33,29	63	53,47	89	71,81
12	11,58	38	34,11	64	54,20	90	72,48
13	12,48	39	34,93	65	54,93	91	73,15
14	13,40	40	35,74	66	55,66	92	73,82
15	14,31	41	36,55	67	56,39	93	74,49
16	15,22	42	37,35	68	57,12	94	75,16
17	16,13	43	38,14	69	57,84	95	75,83
18	17,03	44	38,93	70	58,56	96	76,49
19	17,93	45	39,75	71	59,28	97	77,15
20	18,82	46	40,53	72	60,00	98	77,81
21	19,70	47	41,31	73	60,71	99	78,47
22	20,58	48	42,09	74	61,42	100	79,12
23	21,46	49	42,87	75	62,13	110	85,58
24	22,33	50	43,65	76	62,84	120	91,86
25	23,20	51	44,42	77	63,54	130	97,99
26	24,06	52	45,19	78	64,24	140	103,97
27	24,92	53	45,96	79	64,94	150	107,87
28	25,78	54	46,72	80	65,64		
29	26,63	55	47,48	81	66,33		
30	27,48	56	48,24	82	67,02		

From what has been ſaid upon the ſecond cauſe aſſigned for the obſtruction the jet meets with in riſing to the height of the reſervoir, which is the friction againſt the ſides of the whole and the adjutage, it appears, *cæteris paribus*, that the hole in the adjutage ought to be made in a thin plate of braſs, and not through the bore of a tube of any length, becauſe of the quantity of ſurface in ſuch an adjutage-piece which muſt greatly retard the jet, and diminiſh the height.

If the conduit-pipe E F G be not of a proper ſize to ſupply water as faſt as it can be expended at the adjutage G, the jet will likewiſe be checked, and it will not riſe to the full height. To aſcertain the proportion of the conduit-pipe to the bore of the adjutage, is ſhewn by the following table, made by Mr. Mariotte, Dr. Deſaguliers, and others, who, by various experiments, found that if the reſervoir be 5 feet high, a conduit pipe 1 $\frac{3}{4}$ inch diameter will admit a hole in the adjutage from $\frac{1}{4}$ of an inch to $\frac{3}{8}$ of an inch; and ſo on, as in the following table.

Height of the reſervoir.	Diameter of the adjutages.	Diameter of the pipes of conduit.
Feet.	Inch.	Inch.
5	$\frac{1}{4}$ to $\frac{3}{8}$	1 $\frac{3}{4}$
10	$\frac{1}{4}$ to $\frac{1}{2}$	2
15	$\frac{1}{2}$	2 $\frac{1}{4}$
20	$\frac{1}{2}$	2 $\frac{1}{2}$
25	$\frac{1}{2}$	2 $\frac{3}{4}$
30	$\frac{1}{2}$ to $\frac{3}{4}$	3 or 3 $\frac{1}{2}$
40	$\frac{3}{4}$	4 $\frac{1}{4}$
50	$\frac{3}{4}$	5
60	1	5 $\frac{3}{4}$
80	1$\frac{1}{4}$	6 $\frac{1}{2}$
100	1$\frac{1}{4}$ or 1$\frac{1}{2}$	7 or 8

Here the jet is ſuppoſed to be within 100 or 150 yards of the reſervoir; but if the conduit-pipe much exceeds this length, it muſt be of a larger diameter than what is here aſſigned: thus, for jets from $\frac{2}{4}$ of an inch, to thoſe of an inch, and from reſervoirs from 40 to 90 feet height, if the diſtance be from 150 yards to $\frac{1}{4}$ of a mile, the diameter of the pipe ſhould be of 6 inches; from $\frac{1}{4}$ of a mile to 2 miles it muſt be of 7 inches; and from 2 miles to 5, it muſt be 8 inches diameter for the ſame jets. If it be required to keep any number of jets playing, whoſe adjutages are given in diameter by one common conduit pipe, we muſt find the diameter of an adjutage equal to all the given ones: thus, if there be four adjutages of $\frac{3}{4}$ of an inch each, then the ſquare of $\frac{3}{4}$ is $\frac{9}{16}$, which multiplied by the number of adjutages 4, makes $\frac{36}{16}$, the ſquare root of which is $\frac{6}{4} = 1\frac{1}{2} =$ the diameter of the adjutage, equal to all the four ſmall ones. A pipe of conduit of 10 inches diameter will ſupply all the jets, as being a little more than ſix times as great as the diameter of the one large adjutage now found. After this manner the dimenſions of a conduit pipe may be found for any number of adjutages.

A fountain that ſhall ſpout the water in various directions is made as follows: ſuppoſe the vertical tube in which the water riſes, to be A B (*ibid.* n° 2.) in this fit ſeveral other tubes, ſome horizontal, others oblique, ſome inclining, others reclining, L, O, P, A, N, *&c.* then as all water retains the direction of the aperture through which it is ſpouted, that iſſuing through A will riſe perpendicularly,

larly, and that through L, H, N, P, O, will deſcribe arches of different magnitudes, tending different ways.

Or thus: ſuppoſe the vertical tube A B (*ibid.* n° 3.) to be ſtopped at top, as at A; and inſtead of pipes, or jets, let it be only perforated with little holes all round, or only half its ſurface; then will the water ſpout forth in all directions through the little apertures, to a diſtance proportioned to the height of the fall of the water.

A ball, A, if its weight be not too heavy, being laid in the bottom of the cup or baſon B (*ibid.* n° 4.) will be taken up in the ſtream, and ſuſtained at a conſiderable height, as A; alternately vibrating, or playing up and down, provided the tube B C, through which the water riſes, be exactly perpendicular to the horizon.

The ball may be made of a thin plate of braſs, or any other light metal; but as its figure of a ball contributes nothing to its reciprocal riſe and fall, any other body, not too heavy, may be ſubſtituted in place thereof. As it is neceſſary that the body ſuſtained by the jet, ſhould keep the ſame preciſe perpendicular on its deſcent and riſe, ſince otherwiſe it would miſs the ſtream, ſuch a fountain ſhould be played in a place free from wind.

A fountain may be made to ſpout water in manner of a ſhower, by fitting a ſpherical or lenticular head A B (*ibid.* n° 5.) made of a plate of metal, and perforated at top with a great number of little holes; for the water, riſing with a certain velocity towards A B, will there be divided in innumerable little threads, and afterwards be broke and diſperſed into ſmall drops.

A fountain may be made to ſpread the water in form of a cloth, by ſoldering two ſpherical ſegments C and D (*ibid.* n° 6.) ſo cloſe together as to be almoſt touching one another, with a ſcrew E, to contract or amplify the interſtice, or chink, at pleaſure: then this ſpherical head being fitted upon the tube, the water ſpouting through the chink, will expand itſelf in manner of a cloth.

The theory of fountains, with regard to the action of air upon water by condenſation and rarefaction, may be ſufficiently underſtood from what has been delivered under the articles FLUID, AIR, ENGINE, CONDENSATION, RAREFACTION, and ELASTICITY; whence it appears, that condenſed air injected into any veſſel containing water, will, by means of its elaſticity, cauſe the water to ſpout out thro' an adjutage to an height proportionable to the ſpring of the condenſed air. Upon this principle the following fountain A B (*ibid.* n° 7.) depends, where the air is condenſed at the top of the water by a ſyringe, and the air and water retained by the cock at C, ſo that the fountain cannot play till you open the cock; then the water ſtrongly preſſed by the condenſed air at S S, goes through the pipe *o*, and the adjutage *b*, with great force, in jets of ſeveral figures, according to the ſpouting-pipes, put on at *b*.

As here the air is compreſſed by a ſyringe, in the fountain (*ibid.* n° 8.) the air being only compreſſed by the concealed fall of water, makes a jet, which, ſeen for a while, is looked on as a perpetual motion by the ignorant, who think that the ſame water that fell from the jet, riſes again.

The boxes C E, and D Y X, being cloſe, you ſee only the baſon A B W, with a hole at W, into which the water, ſpouting out at B, falls; but that water going down the hole W, does not come up again at W, but runs down through the pipe W X, into the box D Y X, from whence it drives out the air thro' the aſcending pipe Y Z, into the cavity of the box C E, where, preſſing upon the water that is in it, it forces it out through the ſpouting-pipe O B, as long at there is any water in C E; ſo that this whole play is only while the water contained in C E, having ſpouted out, falls down through the pipe W X, into the cavity DYX. The force of the jet is proportionable to the height of the pipe W X, or of the boxes C E and D Y, above one another. The height of the water meaſured from the baſon A B W, to the ſurface of the water in the lower box D Y X is always equal to the height meaſured from the top of the jet to the ſurface of the water in the middle cavity at C E. Now ſince the ſurface C E is always falling, and the water D Y is always riſing, the height of the jet muſt continually decreaſe, till it is ſhorter by the heighth of the depth of the cavity C E, which is emptying, added to the depth of the cavity D Y, which is always filling, and when the jet is fallen ſo low, it immediately gives over.

The way to prepare this fountain for playing, is as follows: firſt, pour in water at W, till you have filled the cavity

D X Y; then turn the fountain over, and the water will run from the cavity D X Y into the cavity C E, which you will know to be full when the water runs out at B, held down; ſet the fountain up again, and pour in about a pint of water into the baſon A B W, and ſo ſoon as it has filled the pipe W X, the fountain will play, and continue ſo long as there is any water in C E. You may then pour back the water left in the baſon A B W, into any veſſel, and invert the fountain; which being ſet upright again, will be ſet a playing by putting back the water poured out into A B W.

A fountain, which, when it has done ſpouting, may be turned up like an hour-glaſs, is made as follows: provide two veſſels, A F H and B D G (*ib.* n° 9.) of a capacity proportionable to the time the fountain is required to play without turning up, and placed at ſo much the greater diſtance from each other as the water is required to ſpout the higher: the water contained in the cavity A F H, runs down the curve pipe C D E, and ſpouts up through the jet E, by the preſſure of the column of water C D; but unleſs the pipe G F, was open at G, to let the air run up to F, and preſs at the top of the ſurface of the water in the cavity A, the water would not run down and ſpout out at E: there is ſuch another pipe as G K, belonging to the cavity B, through which the water of the jet is received into the baſon, ſupplies the cavity B, whilſt the fountain ſtands on the end B; but when the fountain is inverted, it ſupplies B with air, to let the water deſcend in the direction G H I, I becoming the ſpouting-pipe. Wherefore, by turning the machine upſide down, the water ſpouts up through the cock at G, and the veſſel A H C, will be the reſervoir. Hence, if the veſſels A F H and D K B contain juſt as much water as will be ſpouted up in an hour's time, we ſhall have a ſpouting clepſydra, which may be graduated or divided into quarters, minutes, &c. See the article CLEPSYDRA.

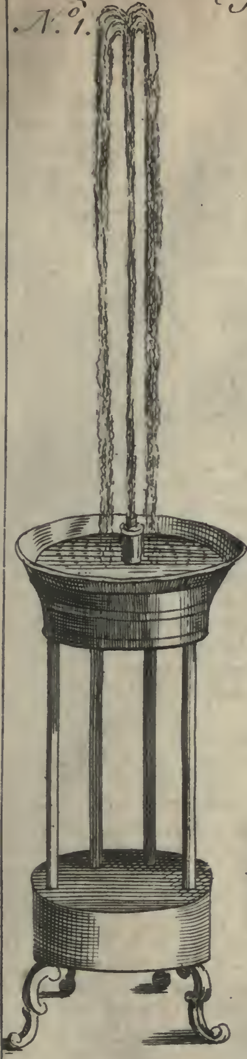
The fountain (plate CVI. n° 1.) is upon the ſame principle, and of the ſame kind with n° 8. plate CV. but having double the number of pipes and concealed cavities, it plays as high again. N° 2. muſt be examined, to ſee its cavities and pipes, where the baſon is A, and the four cavities B, C, D, and E, from which the water from the pipe *f* G, ſpouts out to double the height of the fountain; the air at E, which drives it, being doubly condenſed. The water going down the pipe 1 (ſuppoſe it three feet long) condenſes the air that goes up into the cavity C, through the pipe 2, ſo as to make it $\frac{1}{10}$ ſtronger than the common air; then the water which falling in the pipe 3, from C to D, is capable by the height of its fall, to condenſe the air at E. ſo as to make it $\frac{1}{10}$ ſtronger, being puſhed at C by air already condenſed into $\frac{1}{10}$ leſs ſpace, cauſes the air at E to be condenſed twice as much; that is, to be $\frac{1}{5}$ ſtronger than the common air, ſo that it will make the water at G ſpout out with twice the force, and go to twice the height that it would do, if the funtain had been of the make of n° 8. pl. CV. The way to prepare this fountain for playing, is to turn it upſide down, and taking out the plugs *g*, *h*, to fill the two cavities C and E, and having ſhut the holes again, ſet the fountain upright, and pour ſome water into the baſon A, and the jet will play out at G.

Another way of making artificial fountains, is by the rarefaction of the air, in the manner following: A B and C D (*ibid.* n° 3.) are two pipes fixed to a braſs head C, to ſcrew into a glaſs-veſſel E which having a little water in it, is inverted, till the pipes are ſcrewed on; then reverting it ſuddenly, ſo as to put A the lower end of the ſpouting-pipe A B, into a jar of water A; and the lower end of the deſcending pipe C D, into a receiving veſſel D, the water will ſpout up from the jar A, into the tall glaſs veſſel E, from which it will go down at the orifice C, through the deſcending pipe C D, into the veſſel D, till the water is out of A (making a fountain in E), and has emptied itſelf into D.

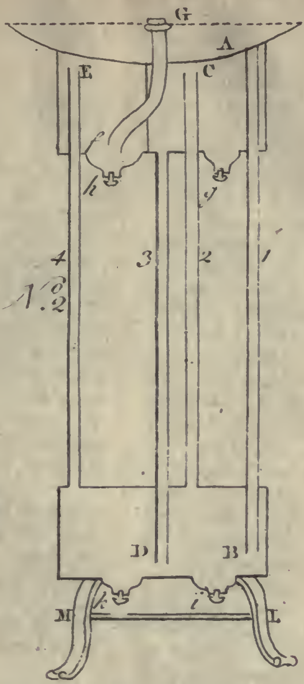
The reaſon of the play in this fountain is this: the pipe C D being 2 feet 9 inches long, lets down a column of water which rarifies the air $\frac{1}{12}$ part in the veſſel E, where it preſſes againſt the water ſpouting at B, with $\frac{1}{12}$ leſs force than the water is puſhed up the hole A, by the preſſure of the common air on the water in the veſſel A; ſo that the water ſpouts up into E (when the air is rarified $\frac{1}{12}$) with the difference of the preſſure of the atmoſphere, and the aforeſaid rarified air; that is, of 33 to $2\frac{3}{4}$. This would raiſe the water 2 feet 9 inches, but the length of the pipe A, 9 inches, being

Fig. 1. FOUNTAINS.

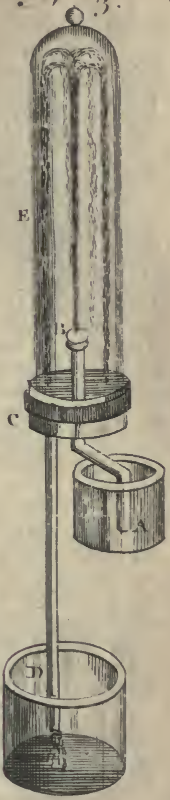
N.° 1.



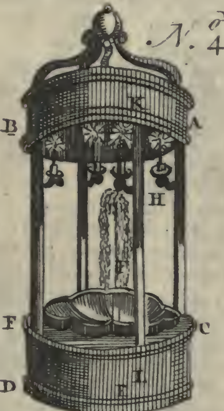
N.° 2.



N.° 3.



N.° 4



N.° 5.

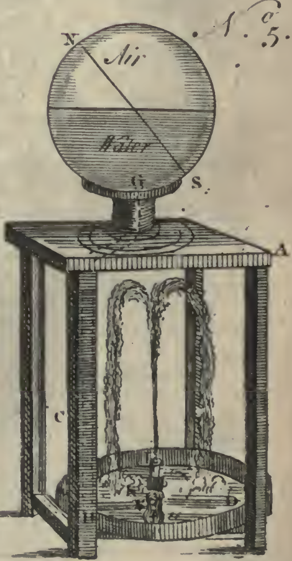


Fig. 2. FOURCHEE.

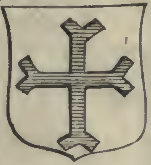
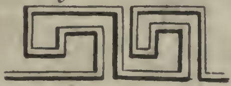


Fig. 3. FRET.



T. Jefferys sculp

deducted, the jet will only riſe 2 feet. This may be called a ſyphon-fountain, where A B is the driving leg, and C D the iſſuing leg.

A fountain that begins to play upon the lighting of candles, and ceaſes when they go out, may be contrived as follows: provide two cylindrical veſſels A B and C D (*ibid.* n° 4.) connect them by tubes open at both ends K L, F B, &c. ſo that the air may deſcend out of the higher into the lower; to theſe tubes ſolder candle-ſticks, H, &c. and to the hollow cover of the lower veſſel C F, fit a little tube or jet F E, furniſhed with a cock G, and reaching almoſt to the bottom of the veſſel. In G let there be an aperture furniſhed with a ſcrew whereby water may be poured into C D. Then upon lighting the candles H, &c. the air in the contiguous tubes becoming rarefied thereby, the water will begin to ſpout through E F.

There are many other artificial fountains made upon theſe principles; but what are explained may be ſufficient, when we have added to it the deſcription of one invented by Dr. Deſaguliers to play by the ſpring of the air, increaſed by the heat of the ſun, which alſo ſerves for a dial at the ſame time.

G N S (*ibid.* n° 5.) is a hollow globe of thin copper, of 18 inches in diameter, ſupported by a ſmall inverted baſon, ſtanding on a frame with four legs A, B, C, &c. which have between them, at the bottom, a large baſon of two feet diameter. Along the leg C comes a concealed pipe, going from G, the bottom of the inſide of the globe, which pipe comes along H V to join in an upright pipe *u* I, to make a jet at I. The ſhort pipe I *u* going to the bottom of the baſon, has a valve at V, under the horizontal part H *u*, and another valve at V, above the ſaid horizontal pipe, under the cock at K. The north pole N, has a ſcrew to open an hole, whereby to fill the globe with water. Things thus prepared, and the globe half filled with water, let the machine be ſet in a garden; and the heat of the ſun rarefying the air, as it heats the copper, the air will preſs hard upon the water, which coming down the pipe G C H V I, will lift up the valve V, but ſhut the valve *u*; and the cock being open, ſpout out at I, and continue to do ſo for a long time, if the ſun ſhines. At night, as the air condenſes again, the outward air preſſing the adjutage I, will ſhut the valve V, but preſſing on the baſon D *u* H, it will puſh up the water, which has been played in the day time through the valve *u*, and pipe *u* H G into the globe, ſo as to fill it up again to the ſame height that the water was at firſt, and the next ſun-ſhine will cauſe the fountain to play again, &c.

The uſe of the cock is to keep the fountain from playing till the time of day that you think proper. A ſmall jet will play ſix or eight hours, If the globe be ſet for the latitude of the place, and rectified before it be fixed, with the hour lines or meridians drawn upon it, the hours marked and the countries painted as in the common globe, it will be a good dial; the ſun ſhining upon the ſame places in this globe, as it does upon the the earth itſelf.

FOUNTAIN PEN. See the article PEN.

FOUR CORNERS, in the manege. To work upon the four-corners, is to divide (in imagination) the volt, or round, into four quarters: when a horſe has made a round or two, either at trot or gallop, he is ſaid to have made the four-corners.

FOURCHE'E, or FOURCHY, in heraldry, an appellation given to a croſs forked at the ends. See plate CVI. fig. 2.

FOURCHER, or FOURCHING, in law, ſignifies the delaying or putting off an action, which might have been brought to a determination in a ſhorter time.

FOURCHETTE, or FER DE FOUCHETTE. See the article FER.

FOURTH, in muſic, one of the harmonical intervals, called concords. See the articles CONCORD and INTERVAL.

It is called fourth, as containing four ſounds or terms between its extremes, and three intervals; or as being the fourth in order of the natural or diatonic ſcale, from the fundamental. The antients called it diateſſaron, and ſpeak of it as the principal concord, on whoſe diviſions all the reſt depend; but the moderns, ſo far from allowing it ſuch perfections, find it one of the moſt imperfect, and even diſpute whether it ought to be received among the number of concords at all.

It conſiſts in the mixture of two ſounds in the ratio of 4 : 3; that is, of two ſounds produced by two cords, whoſe lengths, &c. are in that proportion.

Diminiſhed FOURTH. See DIMINISHED.

Superfluous FOURTH, a diſcord conſiſting of two tones major and one minor, called alſo triton: it is compoſed of the ratios 27 : 20, and 4 : 5. See DISCORD.

FOURTH-RATE. See the article RATE.

FOWEY, a borough-town of Cornwall, which ſends two members to parliament: weſt long. 5°, and north lat. 50° 26′.

FOWL, among zoologiſts, denotes the larger ſorts of birds, whether domeſtic or wild: ſuch are geeſe, pheaſants, partridges, turkey, ducks, *&c.* See the articles GOOSE, PHEASANT, *&c.*

Tame fowl make a neceſſary part of the ſtock of a country farm. See the article POULTRY.

Fowls are again diſtinguiſhed into two kinds, *viz.* land and water fowl; theſe laſt being ſo called, from their living much in and about water: alſo into thoſe which are accounted game, and thoſe which are not. See the article GAME.

FOWLING, the art of catching birds by means of nets, bird-lime, decoys, and other devices. See the articles NET, BIRD-LIME, *&c.*

FOWLING is alſo uſed for the purſuing and taking birds with hawks, more properly called falconry. See FALCONRY.

FOWLING-PIECE, a light gun for ſhooting birds. That piece is always reckoned beſt which has the longeſt barrel, from 5½ to 6 feet, with a moderate bore; tho' every fowler ſhould have them of different ſizes, ſuitable to the game he deſigns to kill. The barrel ſhould be well poliſhed and ſmooth within, and the bore of an equal bigneſs from one end to the other; which may be proved, by putting in a piece of paſteboard, cut of the exact roundneſs of the top: for if this goes down without ſtops or ſlipping, you may conclude the bore good. The bridge-pan muſt be ſomewhat above the touch-hole, and ought to have a notch to let down a little powder; this will prevent the piece from recoiling, which it would otherwiſe be apt to do. As to the locks, chooſe ſuch as are well filed with true work, whoſe ſprings muſt be neither too ſtrong nor too weak. The hammer ought to be well hardened, and pliable to go down to the pan with a quick motion.

In ſhooting, obſerve to do it, if poſſible, with the wind, not againſt it; and rather ſideways, or behind the fowl, than full in their faces. Obſerve alſo to chooſe the moſt convenient ſhelter you can find, as a hedge, bank, tree, or the like. Take care to have your dogs under good command, that they may not dare to ſtir till you give the word, after diſcharging your piece: for ſome ill-taught dogs will, upon only the ſnap of the cock, preſently ruſh forward, and ſpoil your ſport. If you have not ſhelter enough, you muſt creep upon your hands and knees, or even make uſe of a ſtalking-horſe.

FOX, *vulpes*, in zoology, an animal of the dog-kind, which much reſembles the common dog in form, and is of the ſize of a ſpaniel: it is chiefly diſtinguiſhed by its long and ſtraight tail, with the tip white. See the articles CANIS and DOG.

The fox is a native of moſt northern countries. That of Siberia, is about the ſize of the common kind; but its head is larger, and its tail not only larger and more buſhy, but all of one colour. See plate CVII. fig. 1.

A fox in the firſt year is called a cub; in the ſecond, a fox; and afterwards an old fox. It is a beaſt of chace, uſually very prejudicial to the huſbandman, by taking away and deſtroying his lambs, geeſe, poultry, *&c.* The common way to catch him is by gins; which being baited, and a train made by drawing raw fleſh acroſs in his uſual paths or haunts to the gin, it proves an inducement to bring him to the place of deſtruction. They are alſo taken with grey-hounds, hounds, terriers, and nets. It is a commendable exerciſe to hunt theſe miſchievous beaſts, the nature of which in many reſpects is like that of wolves. See the article HUNTING.

FOX-GLOVE, *digitalis*, in botany. See the article DIGITALIS.

FOY, or ST. FOY, a town of Guienne, in France, thirty-two miles eaſt of Bourdeaux, it is ſituated under the meridian of London, in 44° 50′, north lat.

FOYLING OF LAND, the ſame with fallowing it. See the article FALLOWING.

FOYLING, among ſportſmen, denotes the footſteps of a ſtag on graſs or leaves.

FRACHES, in glaſs-making, flat iron-pans, wherein the new-made veſſels are put, to be removed gradually from the fire. See the article GLASS.

FRACTION, in arithmetic and algebra, is a part or parts of ſomething conſidered as an unite or integer.

Fractions are diſtinguiſhed into vulgar or common, and ſexageſimal and decimal. See the articles SEXAGESIMALS and DECIMAL.

Vulgar fractions, called alſo ſimply fractions, conſiſt of two parts or quantities, one wrote over the other, with a line between them. The quantity placed above the line is called the numerator of the fraction; and the quantity, placed under the line, the denominator. See the articles NUMERATOR and DENOMINATOR.

Thus, $\frac{2}{3}$ expreſſes the quotient of 2 divided by 3; and 2 is the numerator, and 3 the denominator. If the numerator of a fraction is equal to its denominator, then the fraction is equal to unity: Thus $\frac{4}{4}=1$, and $\frac{a}{a}$ or $\frac{b}{b}$ are likewiſe equal to unity. If the numerator is greater than the denominator, then the fraction is greater than unit. In both theſe caſes, the fraction is called improper. But if the numerator is leſs than the denominator, then the fraction is leſs than unit, and is called proper. Thus $\frac{5}{3}$ is an improper fraction, but $\frac{3}{4}$ or $\frac{2}{3}$ are proper fractions. A mixt quantity is that whereof one part is an integer, and the other a fraction; as $3\frac{4}{5}$, $5\frac{2}{3}$, and $a+\frac{a^2}{b}$. See the articles CHARACTER and NOTATION.

Problem I. To reduce a mixt quantity to an improper fraction, multiply the part that is an integer by the denominator of the fractional part; and, to the product, add the numerator; then place the former denominator under this ſum, and you will have the improper fraction required.

Thus, $2\frac{3}{5}$, reduced to an improper fraction, gives $\frac{13}{5}$; for $2 \times 5 = 10$, and $10 + 3 = 13$, which, divided by the former denominator 5, gives $\frac{13}{5}$. In the ſame manner $4\frac{1}{2}$, gives $\frac{9}{2}$; and $a+\frac{a^2}{b}$, gives $\frac{ab+a^2}{b}$; and $a-x+\frac{a^2-ax}{x}=\frac{a^2-x^2}{x}$.

Problem II. To reduce an improper fraction to a mixt quantity, divide the numerator of the fraction by the denominator, and the quotient ſhall give the integral part; and the remainder, ſet over the denominator, ſhall be the fractional part. Thus, $\frac{12}{5}=2\frac{2}{5}$; $\frac{ab+a^2}{b}=a+\frac{a^2}{b}$; $\frac{ax+2xx}{a+x}=x+\frac{x^2}{a+x}$; and $\frac{aa+xx}{a-x}=a+x+\frac{2xx}{a-x}$.

Problem III. To reduce fractions of different denominations to fractions of equal value, that ſhall have the ſame denominator; multiply each numerator, taken ſeparately, into all the denominators but its own, and the products ſhall give the new numerators: then multiply all the denominators into one another, and the product ſhall give the common denominator. Thus, $\frac{2}{3}$, $\frac{3}{4}$, and $\frac{4}{5}$, are reſpectively equal to $\frac{40}{60}$, $\frac{45}{60}$, and $\frac{48}{60}$, and $\frac{a}{b}$, $\frac{b}{c}$, and $\frac{c}{d}$ are reſpectively equal to $\frac{acd}{bcd}$, $\frac{bbd}{bcd}$, and $\frac{ccb}{bcd}$.

Problem IV. To add and ſubtract fractions, firſt reduce them to a common denominator (by Probl. III.) then add or ſubtract the numerators, and the ſum or difference ſet over the common denominator, will be the ſum or difference required. Thus, $\frac{2}{3}+\frac{3}{4}=\frac{8+9}{12}=\frac{17}{12}=1\frac{5}{12}$; and $\frac{3}{4}-\frac{2}{3}=\frac{9-8}{12}=\frac{1}{12}$. In the ſame manner, $\frac{a}{b}+\frac{c}{d}+\frac{e}{f}=\frac{adf+cbf+ebd}{bdf}$; $\frac{a}{b}-\frac{c}{d}=\frac{ad-cb}{bd}$; and $\frac{x}{2}-\frac{x}{3}=\frac{3x-2x}{6}=\frac{x}{6}$. See SUBSTRACTION.

Problem V. To multiply fractions; let their numerators be multiplied into one another, to obtain a new numerator, and the denominators into one another, to obtain a new denominator; and the numerator and denominator ſo found will be the product required.

Thus, $\frac{2}{3}\times\frac{4}{5}=\frac{8}{15}$; and $\frac{1}{2}\times\frac{2}{3}=\frac{2}{6}=\frac{1}{3}$. In the ſame manner, $\frac{a}{b}\times\frac{c}{d}=\frac{ac}{bd}$; and $\frac{a+b}{c}\times\frac{a-b}{d}=\frac{a^2-b^2}{cd}$.

If a mixt quantity is to be multiplied, firſt reduce it to the form of a fraction (by Probl. I.) and if an integer is to be multiplied by a fraction, you may reduce it to the form of a fraction, by placing unit under it. Thus, $5\frac{2}{3}\times\frac{3}{4}=\frac{17}{3}\times\frac{3}{4}=\frac{51}{12}=4\frac{1}{4}$, (by Probl. II.) Alſo $9\times\frac{2}{3}=\frac{9}{1}\times\frac{2}{3}=\frac{18}{3}=6$; and, in the ſame manner, $b+\frac{bx}{a}\times\frac{a}{x}=\frac{ba+bx}{a}\times\frac{a}{x}=\frac{a^2b+abx}{ax}=\frac{ab+bx}{x}$.

Problem VI. To divide fractions; firſt multiply the numerator of the dividend by the denominator of the diviſor, and the product will be the numerator of the quotient; then multiply the denominator of the dividend by the numerator of the diviſor, and their product will give the denominator of the quotient. Thus,

$$\tfrac{4}{3})\tfrac{2}{3}(\tfrac{10}{12};\ \tfrac{3}{7})\,\tfrac{5}{8}(\tfrac{35}{24};\tfrac{c}{d}\Big)\frac{a}{b}\Big(\frac{ad}{cb};$$

$$\text{and } \frac{a+b}{a-b}\Big)\frac{a-b}{a}\Big(\frac{a^2-2ab+b^2}{a^2+ab}.$$

Theſe laſt four problems are eaſily demonſtrated from the definition of a fraction. 1. It is obvious, that the fractions $\frac{a}{b}$, $\frac{c}{d}$, $\frac{e}{f}$, are reſpectively equal to $\frac{adf}{bdf}$, $\frac{cbf}{bdf}$, $\frac{ebd}{bdf}$; ſince if you divide adf by bdf, the quotient will be $\frac{a}{b}$; $\frac{cbf}{bdf}, = \frac{c}{b}$; and $\frac{ebd}{bdf} = \frac{e}{f}$. 2. Fractions reduced to the ſame denominator are added by adding their numerators and ſubſcribing the common denominator.

Thus, $\frac{a}{b}+\frac{c}{b}=\frac{a+c}{b}$; for call $\frac{a}{b}=m$, and $\frac{c}{b}=n$, and it will be $a=mb$, and $c=nb$; and $mb+nb=a+c$, and $m+n=\frac{a+c}{b}$; that is, $\frac{a}{b}+\frac{c}{b}$. After the ſame manner, $\frac{a}{b}-\frac{c}{b}=m-n=\frac{a-c.}{b}$

3. Again, $\frac{a}{b}\times\frac{c}{d}$ $(=m\times n)=\frac{ac}{bd}$; for $bm=a$, $dn=c$; and $bdmn=ac$, and $mn=\frac{ac}{bd}$; that is, $\frac{a}{b}\times\frac{c}{d}=\frac{ac}{bd}$. 4. Laſtly, $\frac{a}{b}\div\frac{c}{d}$, or $\frac{m}{n}$, gives $\frac{ad}{cb}$; for $mb=a$, and $mbd=ad$; $nd=c$, and $ndb=cb$: therefore $\frac{mbd}{ndb}=\frac{ad}{cb}$; that is, $\frac{m}{n}=\frac{ad}{cb}$.

Problem VII. To find the greateſt common meaſure of two numbers; that is, the greateſt number that can divide them both without a remainder. Firſt divide the greater number by the leſſer, and if there is no remainder, the leſſer number is the greateſt common diviſor required. If there is a remainder, divide your laſt diviſor by that remainder; and thus proceed, continually dividing the laſt diviſor by its remainder, till there is no remainder left; and then the laſt diviſor is the greateſt common meaſure required. Thus, the greateſt common meaſure of 45 and 63 is 9; and the greateſt common meaſure of 256 and 48, is 16, as appears from the operation at large.

```
45)63(1              48)256(5
 45                    240
 --                    ---
  18)45(2                16)48(3
     36                     48
     --                     --
      9)18(2                00
        18
        --
        00
```

Much after the ſame manner, the greateſt common meaſure of algebraical quantities is diſcovered; only the remainders that ariſe in the operation are to be divided by their ſimple diviſors, and the quantities are always to be ranged according to the dimenſions of the ſame letter. Thus, to find the greateſt common meaſure of a^2-b^2 and $a^2-2ab+b^2$, the operation is thus:

$a^2-b^2)\,a^2-2ab+b^2\,(1$

$\qquad a^2-b^2$

$\qquad \overline{-2ab+2b^2}$ remainder, which divided by $-2b$ is reduced to

$a-b)\,a^2-b^2\,(a+b.$

$\qquad a^2-b^2$

$\qquad \overline{0\quad 0}$

Therefore, $a-b$ is the greateſt common meaſure required.

The ground of this operation is, that any quantity that meaſures the diviſor and the remainder (if there is any) muſt alſo meaſure the dividend; becauſe the dividend is equal to the ſum of the diviſor multiplied into the quotient, and of the remainder added together. Thus, in the laſt example, $a-b$ meaſures the diviſor a^2-b^2, and the remainder $-2ab+2b^2$; it muſt therefore likewiſe meaſure their ſum $a^2-2ab+b^2$. You muſt obſerve, in this operation, to make that the dividend which has the higheſt powers of the letter, according to which the quantities are ranged.

Problem VIII. To reduce any fraction to its loweſt terms: find the greateſt common meaſure of the numerator and denominator; divide them by that common meaſure, and place the quotients in their room, and you ſhall have a fraction, equivalent to the given fraction, expreſſed in the loweſt terms. Thus, $\frac{3}{9}$ is reduced to $\frac{1}{3}$, by dividing the numerator and denominator by the greateſt common meaſure 3. In the ſame manner $\frac{20}{25}=\frac{4}{5}$ for $\frac{20}{5}=4$, and $\frac{25}{5}=5$.

In algebraical terms, the operation is thus: $\frac{25bc}{25bc}\Big)\ \frac{75abc}{125bcx}=\frac{3a}{5x}$; which is found by rejecting the diviſor (as being nothing) rejecting the letters bc of the dividend (as being common to numerator and denominator) and dividing the coefficients 75 and 125 by their greateſt common meaſure 25; the reſult of which is $\frac{3a}{5x}$. In the ſame manner, $\frac{156a^2+156ab}{572a^2-572ab}=\frac{3a+3b}{11a-11b}$; $\frac{a^2-b^2}{a^2-2ab+b^2}=\frac{a+b}{a-b}$; $\frac{a^3-b^2a}{a^2+2ab+b^2}=\frac{a^2-ba}{a+b}$; and $\frac{a^4-b^4}{a^5-a^3b^2}=\frac{a^2+b^2}{a^3}$.

When unit is the greateſt common meaſure of the numbers and quantities, then the fraction is already in its loweſt terms. Thus, $\frac{3ab}{5dc}$ cannot be reduced lower. It ought alſo to be remarked, that numbers whoſe greateſt common meaſure is unit, are ſaid to be prime to each other.

If it is required to reduce a given fraction to a fraction equal to it, that ſhall have a given denominator; you muſt multiply the numerator by the given denominator, and divide the product by the former denominator; and this quotient, ſet over the given denominator, will be the fraction required. Thus, if it were required to reduce $\frac{2}{3}$ to an equal fraction, whoſe denominator ſhall be 6; find the quotient of $\overline{2\times 6}\div 3=4$, then will $\frac{4}{6}$ be the fraction required. In the ſame manner, $\frac{a}{b}$ is reduced to an equal fraction, which has the denominator c, *viz.* $\frac{ac\div b}{c}$; for rejecting c out of both numerator and denominator, there remains $a\div b=\frac{a}{b}$.

For the method of reducing vulgar fractions to equal decimal ones, ſee the article Decimal.

It is obſervable, that when the laſt figure of the denominator of the fraction happens to be 1, 3, 7, or 9, then the decimal parts can never be preciſely equal to the given fraction; yet by continuing the diviſion, you may approximate to its value as near as you pleaſe. Thus $\frac{2}{3}=.666666$, &c. as far as you pleaſe; and, in the ſame manner, $\frac{4}{7}=.57142857 14$, &c. Hence it may be farther obſerved, that theſe imperfect quotients return again, and circulate without end: in the firſt example, the circulation begins immediately; but, in the ſecond, it does not begin again till the operation is continued to the ſeventh place; when the firſt ſix figures are repeated over again, conſtituting what is called the repetend of a decimal fraction.

Theſe repetends ſometimes alſo happen, when other figures, beſides thoſe abovementioned, are the denominator of the fraction. Thus $\frac{1}{6}=.1666666$, &c. *ad infinitum*.

FRACTURE, in ſurgery, a rupture of a bone, or a ſolution of continuity in a bone, when it is cruſhed or broken by ſome external cauſe.

Fractures generally happen when any part of the body, where a bone is ſituated, receives a violent ſhock, either by a fall, or a blow with a piece of timber, &c. or by the ſhot of a gun. There are inſtances where this accident has happened from an internal diſorder, to wit, from the ſcurvy, a caries, or the venereal diſeaſe, which have rendered the ſubſtance of a bone ſo brittle, that it has been fractured without any apparent external accident. See Caries, Scurvy, &c.

Fractures are diſtinguiſhed into ſeveral claſſes. Firſt, every fracture is either ſimple, that is, when no other parts beſides the bone are injured, or compound, as where there is a wound, a diſlocation, hæmorrhage, inflammation, fever, caries, or contuſion of the bone; or where the bone appears to be fractured in ſeveral places at the ſame time. Other differences ariſe with regard to the ſituation of the fracture; ſometimes it happens in the cranium, ribs, vertebræ; ſometimes in the upper or lower limbs; ſometimes in the middle of the bone, and ſometimes in either of the extremities. Again, ſome fractures are tranſverſe, others oblique. In which caſe it frequently happens that the points of the bones wound the neighbouring parts, puſhing quite through the muſcular fleſh, and common integuments; or at leaſt pricking them grievouſly, and bringing on pain, inflammation, tumour, and ſpaſm. Violent contuſions alſo may be claſſed under the head of fractures; for the bones in this caſe are frequently broke into ſplinters, by the falling of any heavy body upon the part, or by any violent preſſure. To fractures of the bones, we may alſo very properly add fiſſures. See the articles FISSURE, CONTUSION, &c.

Fractures of bones are diſcoverable, 1. By the eye, when the injured part is apparently ſhorter than the ſound; or when the patient cannot make uſe of it. 2. By the touch, when a preternatural inequality of the bone may be perceived; or that it bends in a part where nature did not intend it ſhould. 3. By the ear, when upon moving the limb, the cruſhing of the broken bones may be heard. 4. We may ſtrongly ſuſpect a fracture of the part, when it has received a violent blow. And, 5. It is obſervable that the parts are more ſubject to this injury in winter than in ſummer. Laſtly, 6. Sometimes, particularly in fractures that are made in a tranſverſe direction, the broken parts of the bone will immediately, of themſelves, recover their natural ſituation, and leave little room to ſuſpect the diſorder.

Great variety of miſchiefs attend a fractured bone, which differ, 1. With regard to the injured part, and the nature and diſpoſition of the neighbouring parts. 2. With regard to the manner in which fractures are made; for oblique fractures, and thoſe whoſe ſplinters and points wound and vellicate the neighbouring parts, are much more painful and dangerous than tranſverſe fractures. 3. We may judge of the miſchief that is likely to attend a fracture, from the number of pieces into which the bone is broken. And, 4. By obſerving whether the fracture happened at the middle of the bone, or at its extremities. The principal inconveniencies that attend a fracture are theſe: the patient loſes the uſe of the limb; the lower part of the limb will be contracted by the muſcles, which will make it appear diſtorted and deformed; the laceration of the perioſteum and the veſſels of the medulla being in great danger of fiſtulæ and caries. When the nerves are pricked and irritated by ſplinters, the patient ſuffers great pain, convulſions, inflammations, and fever; and if any veſſels ſuffer preſſure, the common conſequences of a contuſion enſue. Sometimes, whilſt the bone is uniting, the broken parts are ſupplied in too plentiful a manner with juices, and the callus is formed irregularly, which occaſions a deformity of the limb. See CALLUS.

In the cure of fractures, the ſurgeon's principal care ſhould be to unite the broken bone, to which three things are neceſſary. 1. That the bone be reſtored to its natural ſituation, which is done by extending and replacing it. 2. That after the bone has recovered its natural ſituation, it be kept there, by giving it reſt, and applying proper bandages. Laſtly, proper remedies muſt be uſed, in order to prevent or remedy the diſorders that uſually attend this accident. See the articles INFLAMMATION, FEVER, &c.

When the fractured bones maintain their natural ſituation, you are under no neceſſity of extending or replacing the limb, but of applying a proper bandage; but when the fractured parts recede from each other, ſome degree of extenſion is neceſſary. See the article EXTENSION *of fractured limbs.*

Sometimes you will be troubled with ſplinters of the bone in your way, which render the reduction of the bone very difficult. If the ſplinters are free, and have no connection with the bone, you muſt remove them carefully. When they adhere to the principal parts, you ſhould endeavour to replace them with the greateſt exactneſs; and where they cannot be reduced or re-united with the bone, they may be removed by a ſtrong pointed forceps. If they are concealed under the ſkin, you muſt endeavour to reduce them to their natural ſituation: if this cannot be done, make an inciſion through the ſkin, and take them out.

The bones being properly replaced, the next thing to be done is to ſecure them in their ſituation, that they may unite to the beſt advantage.

To this end two things are chiefly required. 1. To bind it up properly. And, 2. To lay the limb in a convenient poſture. The apparatus for ſecuring the ſituation of the limb is compoſed of bandages, bolſters, and ſplints. See the articles BANDAGE, BOLSTER, and SPLINT.

In fractures of the lower arm, after you have applied your bandage and dreſſings, you may ſuſpend it in a ſcarf or ſling, which is to hang from the neck: in fractures of the leg, you may reſt the limb upon pillows, or in boxes, placing cuſhions or pillows under it; theſe machines are to be faſtened to the limb with tapes, that it may remain fixed and immoveable.

FRÆNUM, in anatomy, a term applied to ſome membranous ligaments of the body. As,

FRÆNUM LINGUÆ, the ligament under the tongue, which ſometimes ties it down too cloſe to the bottom of the mouth;

and then requires to be inciſed or divided, in order to give this organ its proper and free motion. This diſorder generally ariſes in infants ſoon after their birth, ſo that they cannot move and exert their tongues in the action of ſucking: though it is ſometimes alſo obſerved in adults. For the operation of cutting the frænum, ſee the article TONGUE-TIED.

Each of the lips has alſo its peculiar frænum: the upper one under the noſe; the under one near the roots of the dentes inciſores: theſe are of the utmoſt ſervice to us in ſpeaking, and eating and drinking.

FRÆNUM PENIS, a ligament of the penis, that ties the prepuce to the lower part of the glans of the penis. See PENIS.

There is alſo a ſmall frænum of the clitoris, by which it is connected to the oſſa pubis. See the article CLITORIS.

FRAGA, a town of Arragon, in Spain, ſituated under the meridian of London: north lat. 41° 16′.

FRAGARIA, the STRAWBERRY, in botany, a genus of the *icoſandria-pentagynia* claſs of plants, the corolla of which conſiſts of five roundiſh, patent petals, inſerted in the cup: there is no pericarpium; the common receptacle of the ſeed is of a roundiſh, oval figure, plane at the baſe, pulpoſe, large, ſoft, and deciduous; the ſeeds are numerous ſmall, acuminated, ſcattered over the ſuperficies of the receptacle, and not deciduous.

FRAIGHT, or FREIGHT, in commerce. See the article FREIGHT.

FRAIL, a baſket made of ruſhes, or the like, in which are packed up figs, raiſins, &c. It ſignifies alſo a certain quantity of raiſins, about 75 pounds.

FRAISE, in fortification, a kind of defence, conſiſting of pointed ſtakes, ſix or ſeven feet long, driven parallel to the horizon into the retrenchments of a camp, a half-moon, or the like, to prevent any approach or ſcalade.

Fraiſes differ from paliſades chiefly in this, that the latter ſtand perpendicular to the horizon, and the former jet out parallel to the horizon, or nearly ſo, being uſually made a little ſloping, or with the points hanging down. Fraiſes are chiefly uſed in retrenchments and other works thrown up of earth; ſometimes they are found under the parapet of a rampart, ſerving inſtead of the cordon of ſtone uſed in ſtone-works.

To **FRAISE** *a battalion*, is to line the muſqueteers round with pikes, that, in caſe they ſhould be charged with a body of horſe, the pikes being preſented, may cover the muſqueteers from the ſhock of the horſe, and ſerve as a barricade.

FRAME, in joinery, a kind of caſe, wherein a thing is ſet or incloſed, or even ſupported, as a window-frame, a picture-frame, &c.

FRAME is alſo a machine uſed in divers arts; as,

FRAME, among printers, is the ſtand which ſupports the caſes. See the article CASE.

FRAME, among founders, a kind of ledge incloſing a board, which, being filled with wetted ſand, ſerves as a mould to caſt their works in. See FOUNDERY.

FRAME is more particularly uſed for a ſort of loom, whereon artificers ſtretch their linens, ſilks, ſtuffs, &c. to be embroidered, quilted, or the like.

FRAME, among painters, a kind of ſquare, conſiſting of four long ſlips of wood joined together, whoſe intermediate ſpace is divided by threads into ſeveral little ſquares like a net; and hence ſometimes called reticula. It ſerves to reduce figures from great to ſmall; or, on the contrary, to augment their ſize from ſmall to great.

FRAMING *of an houſe*, among carpenters, denotes all the timber work therein; namely, the carcaſe, flooring, partitioning, roofing, ceiling, beams, áſhlering, &c. all together. See FLOOR, &c.

FRAMPOLE-FENCES, a privilege enjoyed by the tenants of the manor of Writtel in Eſſex, whereby they are intitled to the wood growing on the fence, and as many poles as they can reach from the top of the ditch with an axe's helve, towards the repair of their fences.

FRANC, or FRANK. See FRANK.

FRANCE, a large kingdom of Europe, ſituated between 5° weſt and 7° eaſt long. and between 43° and 51° north lat. being bounded by the engliſh channel and the auſtrian Netherlands, on the north; by Germany, Switzerland, Savoy, and Piedmont, in Italy, on the eaſt; by the Mediterranean ſea, and the Pyrenean mountains, which ſeparate it from Spain, on the ſouth; and by the bay of Biſcay, on the weſt. This kingdom was formerly divided into twelve provinces, but at preſent it is divided into twenty-five general governments, over every one of which is an officer, called an intendant, appointed by the king, who has a power of controuling the governor, and all other officers of juſtice; and preſides over the receivers-general of his generality.

FRANCFORT, a city of Germany, ſituated on the confines of Heſſe and Franconia, on both ſides of the river Maine: eaſt longitude 7° 30′ north lat. 50° 10′.

FRANCFORT *on the Oder*, a city of Germany in the circle of upper Saxony, and marquiſate of Brandenburg, ſituated in eaſt long. 15°, north lat. 52° 22′.

FRANCHE-COMTE, the ſame with the county of Burgundy. See BURGUNDY.

FRANCHE-COMTE, a province of France bounded by Lorrain on the north; by Alſace and Switzerland, on the eaſt; by La Breſs and Bugey, on the ſouth; and by the dukedom of Burgundy, on the weſt.

FRANCHISE, in a general ſenſe, a privilege or exemption from ordinary juriſdiction; as that for a corporation to hold pleas among themſelves to ſuch a value, or the like.

FRANCHISE is ſometimes uſed for an immunity, from tribute, in which ſenſe it is either perſonal or real; that is, belonging to a perſon immediately, or elſe by means of this or that place of which he is chief, or a member.

A franchiſe may be veſted either in bodies politic, or corporations; in borough towns, or in any ſingle perſon. There are franchiſes of different kinds, as the principality of Wales, counties palatine, counties, hundreds, parts of the ſea, &c. Beſides which there is a franchiſe of having a leet, manor, or lordſhip; as alſo of fairs and markets, felon's goods; as alſo the goods of fugitives and outlaws; deodands, treaſure-trove, waifs, eſtrays, wrecks, &c.

Franchiſes and liberties, being uſually held by charter, are all ſaid to be derived from the crown, but ſome lie in preſcription without the help of any charter.

FRANCHISE ROYAL ſeems to be that where the king's writ does not run; but Bracton ſays, that a franchiſe royal, is where the king grants to one and his heirs an exemption of toll, &c.

FRANCHISE is alſo uſed for an aſylum or ſanctuary, where people are ſecure of their perſons. See ASYLUM.

FRANCHISE *of quarters*, a certain place or diſtrict at Rome, wherein are the houſes of the embaſſadors of the princes of Europe; and where ſuch as retire cannot be arreſted or ſeized by the ſbirri or ſerjeants, nor proſecuted at law.

Several of the popes publiſhed their bulls and ordinances againſt the abuſe made of this privilege, which reſcued ſo conſiderable a part of the city, by the enlargement of theſe places, from their authority, and rendered them a retreat for the moſt abandoned perſons. At laſt Innocent XI. expreſsly refuſed to receive any more embaſſadors, but ſuch as would make a formal renunciation of the franchiſe of quarters.

FRANCIGENÆ, in our old law-books, an appellation given to foreigners in general.

FRANCISCAN MONKS, FRIARS MINOR, or **GREY FRIARS**, religious of the order of St. Francis, founded by him in the year 1209. See the article FRIAR.

The rule of the franciſcans, as eſtabliſhed by St. Francis himſelf, is briefly this: they are to live in common, to obſerve chaſtity, and to pay obedience to the pope and their ſuperiors.

Before they can be admitted into the order, they are obliged to ſell all they have, and give it to the poor: they are to perform a year's noviciate, and when admitted, never to quit the order upon any account. They are to faſt from the feaſt of All-ſaints, to the nativity. This order has produced four popes, forty-two cardinals, and an infinite number of patriarchs. The franciſcans had ſixty-three monaſteries in England, one of which was in the pariſh of St. Nicholas in London.

FRANCOLINI, a town of Italy, ſituated on the river Po, about nine miles north-eaſt of Ferrara.

FRANCONIA, a circle of the german empire, lying between Bohemia on the eaſt, and the electorate of Mentz on the weſt. Its capital is Nuremburg; and from this country the Franks, who conquered and gave name to the kingdom of France, are ſaid to have come.

FRANGIPANE, a kind of exquiſite perfume given to the leather of which gloves, &c. are made.

There is likewiſe a perfumed liquor of the ſame name, as alſo a ros ſolis.

FRANK, or **FRANC**, meaning literally free from charges and impoſitions, or exempt from public taxes, has various ſignifications in our ancient cuſtoms.

FRANK ALMOIGN, ſignifies a tenure by ſpiritual ſervice, where lands or tenements are held by an eccleſiaſtical corporation, ſole or aggregate, to them and their ſucceſſors, of ſome lord and his heirs, in free and perpetual alms.

This is an ancient tenure chiefly to be met with in grants to religious houſes, colleges, &c. No perſon can have lands in frank almoign, unleſs it is by preſcription, or on a grant made before the ſtatutes of mortmain; ſo that the tenure may not be created at this day. Nevertheleſs the king is not reſtrained by the ſtatutes, nor a ſubject licenſed or diſpenſed with by him to make ſuch a grant; and if an eccleſiaſtical perſon holds lands at a certain rent, &c. the lord may confirm his eſtate to hold to him and his ſucceſſors in frank almoign.

Frank chace, is defined to be a liberty of free chace, whereby perſons that have lands within the compaſs of the ſame, are prohibited to cut down any wood, &c. out of the view of the foreſter.

Frank fee, ſignifies the ſame as holding lands and tenements in fee ſimple; that is, to any perſon and his heirs, and not by ſuch ſervice as is required by antient demeſne, but is pleaded at common law. See the article Fee.

Frank ferm, anciently ſignified lands changed in the nature of the fee by feoffment, &c. out of the knights ſervice for other certain yearly ſervices.

Frank fold, is where the lord has the liberty of folding his tenants ſheep within his manor. See the article Faldage.

Frank language, or **Lingua franca**, a kind of jargon ſpoken on the Mediterranean, and particularly throughout the coaſts and parts of the Levant, compoſed of italian, ſpaniſh, french, vulgar greek, and other languages.

Frank law, a word applied to the free and common law of the land, or the benefit a perſon has by it.

He that for any offence loſeth this frank law, incurs theſe inconveniencies, *viz.* He may not be permitted to ſerve on juries, nor uſed as an evidence to the truth; and if he has any thing to do in the king's court, he muſt not approach it in perſon, but appoint his attorney; his lands, goods, and chattels ſhall be ſeized into the king's hands; and his lands be eſtreated; his trees rooted up, and his body committed to cuſtody.

Frank marriage, is where a perſon, ſeized in fee of lands or tenements, has given them to another with his daughter, ſiſter, or ſome woman otherwiſe of kin to him, in free marriage, by virtue of which the huſband and wife have an eſtate in ſpecial tail, and ſhall hold the land of the donor, diſcharged of all ſervices, except fealty, to the fifth degree.

Frank pledge, in our law, ſignifies a pledge of ſurety for the behaviour of freemen.

According to the antient cuſtom of England, for the preſervation of the public peace, every free-born man, at the age of fourteen, except religious perſons, clerks, knights, and their eldeſt ſons, was obliged to give ſecurity for his truth and behaviour towards the king and his ſubjects, or elſe be impriſoned. Accordingly, a certain number of neighbours became interchangeably bound for each other, to ſee each perſon of their pledge forth-coming at all times, or to anſwer for the offence of any one gone away; ſo that whenever any perſon offended, it was preſently inquired in what pledge he was; and there the perſons bound either produced the offender in thirty-one days, or made ſatisfaction for his offence.

Frank service. See the article Service.

Frank tenement, is ſaid to be a poſſeſſion of freehold lands or tenements. See Freehold and Tenement.

Frank, or **Franc**, an ancient coin, either of gold or ſilver, ſtruck and current in France. The value of the gold-frank was ſomewhat more than that of the gold crown; the ſilver-frank was a third of the gold one: this coin is long out of uſe, though the term is ſtill retained as the name of a money of account; in which ſenſe it is equivalent to the livre, or twenty ſols.

FRANKENDAL, a city of Germany, in the palatinate of the Rhine, ſituated on the weſt ſide of the river Rhine, in eaſt long. 8° 15′, north lat. 49° 30′.

FRANKENIA, sea-heath, or sea-chickweed, a genus of the *decandria-monogynia* claſs of plants, the flower of which conſiſts of five petals, with a plain limb; the fruit is an oval, unilocular capſule, covered by the cup, and containing a great many ovated very ſmall ſeeds.

FRANKENSTEIN, a town of Germany, in the palatinate of the Rhine, and dutchy of Zuebruggen, ſituated twelve miles north-weſt of Landau.

FRANKER, a town of the United-provinces, in the province of weſt Frieſland, nine miles weſt of Lewarden.

FRANKINCENSE, *olibanum*, in the materia medica. See Olibanum.

FRANKS, **Frankis**, or **Franquis**, an appellation given by the Turks, and other nations of Aſia, to all the people of the weſtern parts of Europe, to which they give the name of Frankiſtan.

FRANSTAT, or **FRAUSTAT**, a town of Sileſia, ſituated twenty-five miles north-eaſt of Glogaw, ſubject to PRUSSIA.

FRASCATI, or **FRESCATI**, a town of Italy, in the campania of Rome, thirteen miles eaſt of that city, near which place is the tuſculum of Cicero, called Grotto Ferrate.

FRATERCULA, in zoology, the name by which Geſner calls the arctic duck. See the article DUCK.

FRATERNITY, in the roman catholic countries, ſignifies a ſociety for the improvement of devotion.

Of theſe there are ſeveral ſorts; as, 1. The fraternity of the roſary, founded by St. Dominic: it is divided into two branches, called the common roſary, and the perpetual roſary; the former of whom are obliged to confeſs and communicate every firſt Sunday in the month, and the latter to repeat the roſary continually. See the article ROSARY.

2. The fraternity of the ſcapulary, whom the bleſſed virgin, according to the ſabbatin bull of pope John XXII. has promiſed to deliver out of hell the firſt Sunday after their death. See SCAPULARY.

3. The fraternity of St. Francis's girdle, are cloathed with a ſack of a grey colour, which they tie with a cord; and, in proceſſions, walk bare-footed, carrying in their hands a wooden croſs.

4. That of St. Auſtin's leathern girdle, comprehends a great many devotees.

Italy, Spain, and Portugal, are the countries where one ſees the greateſt number of theſe fraternities, ſome of which aſſume the name of arch-fraternities. Pope Clement VII. inſtituted the arch-fraternity of charity, which diſtributes bread every Sunday among the poor, and gives portions to forty poor girls on the feaſt of St. Jerom their patron. The fraternity of death, buries ſuch dead as are abandoned by their relations, and cauſes maſſes to be celebrated for them. The fraternity of St. Mary of the ſuffrage, employ their prayers to releaſe ſouls out of purgatory. The fraternity of mercy, at Liſbon, conſiſts of perſons of the greateſt quality, the king himſelf being a member of it; the deſign of its inſtitution is to procure a great number of maſſes to the faithful, but chiefly to its own members.

What has been ſaid, may ſuffice to ſhew the nature of theſe fraternities; by entering into which, moſt of the devotees believe they are much ſurer of ſalvation, than they could otherwiſe be.

FRATERNITY, in a civil ſenſe, a company or guild of certain artificers or traders. See the articles COMPANY and GUILD.

FRATRICELLI, LITTLE BROTHERS, in church hiſtory, a ſect of heretics who appeared in Italy about the year 1298, and afterwards ſpread all over Europe. They wore the habit of the franciſcan order, and pretended that eccleſiaſtics ought to have no poſſeſſions of their own.

FRATRIAGE, *fratriagium*, the partition among brothers or coheirs, coming to the ſame inheritance or ſucceſſion.

Fratriage more particularly ſignifies a younger brother's inheritance; or whatever the younger ſons poſſeſs of the father's eſtate, which, in our antient law, they are ſaid to enjoy ratione fratriagii; and were to do homage for the ſame to the elder brother, he being bound to do homage to the ſuperior lord for the whole.

FRATRES ARVALES. See ARVALES.

FRATRES CONJURATI, in our antient law-books, *&c.* ſignify ſworn brothers, or thoſe who took an oath to defend the king againſt his enemies.

FRATRICIDE, the crime of murdering one's brother. See PARRICIDE.

FRAUD, in law, ſignifies deceit in grants, or conveyances of lands, *&c.* or in bargains and ſales of goods, *&c.* to the damage of another perſon.

A fraudulent conveyance of lands or goods to deceive creditors, as to creditors is void in law. And a fraudulent conveyance in order to defraud purchaſers, is alſo to ſuch purchaſers void; and the perſons juſtifying or putting off ſuch grants as good, ſhall forfeit a year's value of the lands, and the full value of the goods and chattels, and likewiſe ſhall be impriſoned.

However, when conveyances are fraudulently made, they are not void to all perſons, but only to thoſe that afterwards come to the land as purchaſers on good conſideration. A general gift made of all the goods of a perſon, may be reaſonably ſuſpected to be by fraud, even though a true debt is owing to the party to whom made; and it is void againſt other creditors of the donor. Here the ſeveral marks of fraud in a gift or grant of goods, are as follow, *viz.* 1. If it be general, without any exception of ſome things of neceſſity. 2. If the donor continues to poſſeſs and uſe the goods. 3. If the deed be made in ſecret. 4. If there be a truſt between the parties; or, 5. If made whilſt the action is depending.

Where a perſon is party to a fraud, all that follows thereupon will be intended to be done by him, though fraud ſhall not be preſumed or adjudged to be ſo, until found by jury.

By the ſtatute of frauds, 29 Car. II. agreements for the ſale of lands, leaſes, &c. are required to be in writing. See 3 & 4 Will. and Mary, c. 14.

FRAUS LEGIS, is where the proceſs of the law is uſed with a felonious purpoſe; and a perſon is turned out of poſſeſſion of his houſe, by virtue of a writ of habere facias poſſeſſionem, on a falſe affidavit procured of the ſervice of a declaration in ejectment and judgment had thereon in fraudem legis.

FRAXINUS, the ASH, in botany, a genus of trees, belonging to the polygamia-dioecia claſs, in ſome ſpecies of which there is no corolla; in others there is a ſmall one, formed of four ſlender and acute petals: the fruit is ſingle, of a compreſſed lanceolate figure, and is what we commonly call the aſhen-key, ſeveral cluſters of which are affixed to the ſame common pedicle.

The wood of this tree is in great uſe among ſeveral artificers, as wheel-wrights, cart-wrights, carpenters, turners, &c. alſo for making ploughs, harrows, axle-trees, oars, balls, &c. It is ſaid to be as laſting for building as oak, and often preferred before it: though the timber of the trunk greatly excells that of a bough. Some aſh is alſo ſo curiouſly veined, that the cabinet-makers equal it to ebony, and call it green ebony; ſo that the woodmen, who light upon ſuch trees, may have for it what they will. The ſeaſon for felling this tree, is from November to February; for if cut down too early, or too late, it is liable to the worm. The aſh is hurtful to corn-lands, and therefore ſhould be planted either in hedges or clumps, at about nine or ten feet diſtance.

FRAY, among ſportſmen. A deer is ſaid to fray its head, when it rubs it againſt a tree, to cauſe the pills of the new horns to come off. See the article HEAD.

FREAM, a name given by farmers to plowed lands worn out of heart, and laid fallow till it recover. See FALLOWING.

FREAM, among ſportſmen, denotes the noiſe of a boar in rutting time.

FRECKLES, *lentigines*, ſpots of a yellowiſh colour, of the bigneſs of a lentile-ſeed, ſcattered over the face, neck, and hands. Freckles are either natural, or proceeding accidentally from the jaundice, or the action of the ſun upon the part. Heat, or a ſudden change of the weather, will often cauſe the ſkin to appear of a darker colour than natural, and thereby produce what is called tan, ſunburn, and morphew, which ſeem to differ only in degree; and uſually diſappear in winter. See the article TAN, &c.

Perſons of a fine complexion, and ſuch whoſe hair is red, are the moſt ſubject to freckles, eſpecially in thoſe parts which they expoſe to the air.

To remove freckles, put juice of lemons in a glaſs-vial, and mixing it with ſugar and borax, finely powdered, let it digeſt eight days, and then uſe it. Homberg propoſes bullock's gall, mixed with alum, and, after the alum has precipitated, expoſed three or four months to the ſun in a cloſe vial, as one of the beſt remedies known for the removing of freckles.

FREDENBERG, a town of Germany, in the circle of Weſtphalia, fifty miles weſt of Caſſel.

FREDERICA, a town of Georgia, in North America, ſituated in weſt long. 81° 30′, north lat. 31°, on the iſland of St. Simons, in the mouth of the river Alatamaha.

FREDERICKSBURG, a caſtle and palace of the king of Denmark, ſituated in the iſle of Zeland, twenty miles north-weſt of Copenhagen, built upon piles in the middle of a lake.

FREDERICKSBURG, a fort upon the gold coaſt of Guinea, near cape Three-points, ſubject to the Danes. It lies in weſt long. 2°, north lat. 5°.

FREDERICKSHALL, a ſtrong town of Norway, in the province of Agerhuys, ſituated on the frontiers of Sweden, thirty miles north of Frederickſtat.

FREDERICKSODE, a town of Jutland, in the province of Reypen, ſituated on the little belt in the Baltic-ſea, twenty miles weſt of Odenſee.

FREDERICKSTAT, a town of Sleſwick, or ſouth Jutland, ſituated on the river Eyder, near the german ocean, thirty-one miles weſt of Sleſwick.

FREDERICKSTAT, a town of Norway, in the principality of Agerhuys, ſituated on a bay of the ſea, called the Schaggerrack, near the frontiers of Sweden: eaſt long. 11° 24′, north lat. 59°.

FREE, in a general ſenſe, is uſed in oppoſition to whatever is conſtrained or neceſſitated. When applied to things endowed with underſtanding, it more peculiarly relates to the liberty of the will. See the article FREEDOM.

FREE, among ſeamen. The pump is ſaid to free the ſhip, when it throws out more water than leaks into her. To free the boat, is haling or lading out the water therein.

FREE-BENCH, ſignifies that eſtate in copyhold which the wife, being eſpouſed a virgin, has after the deceaſe of her huſband for her dower, according to the cuſtom of the manor.

In regard to this free-bench, different manors have different cuſtoms, and in the manor of eaſt and weſt Enbourne in the county of Berks, and in other parts of England, there is a cuſtom, that when a copyhold tenant dies, the widow ſhall have her free-bench in all the deceaſed huſband's lands, *dum ſola & caſta fuerit*, whilſt ſhe lives ſingle and chaſte; but if ſhe is found to be guilty of incontinency, ſhe ſhall forfeit her eſtate. Nevertheleſs, upon her coming into the court of the manor riding backwards on a black ram, with his tail in her hand, rehearſing a certain form of words, the ſteward is bound by cuſtom to reſtore her to her free-bench.

FREE-BORD, ground claimed in ſome places beyond or without the fence, and ſaid to contain two foot and an half.

FREE-CHAPEL, is properly a chapel of the king's foundation, and by him exempted from the ordinary's viſitation or juriſdiction.

FREE, or **IMPERIAL CITIES**, in Germany, are thoſe not ſubject to any particular prince, but governed, like republics, by their own magiſtrates. See CITY.

FREE-FAIR. See the articles FAIR.
FREE-FEE. FEE.

FREE HOLD, ſignifies lands or tenements which a perſon holds in fee-ſimple, fee-tail, or for term of life.

Freehold is diſtinguiſhed into freehold in deed, and freehold in law: the firſt of which ſignifies the real poſſeſſion of lands, &c. in fee, or for life; the other is the right that a perſon has to ſuch lands or tenements before his entry.

FREE-HOLD is alſo extended to ſuch offices as a man holds in fee, or during life. See the article FEE.

A freehold, by the common law, cannot commence in futuro, but it muſt take effect preſently, either in poſſeſſion, reverſion, or remainder; and where a perſon pleads liberum tenementum, or freehold, generally the law intends he has an eſtate in fee, and not barely for life. Whatever is part of the freehold, goes to the heir; and things fixed thereto, may not be taken as a diſtreſs for rent, or in execution, &c. No perſon ſhall diſtrain freeholders to anſwer for their freehold, or any thing concerning the ſame, without the king's writ. By the antient laws of Scotland, freeholders are called milites, or knights.

FREE-MASON. See the article MASON.

FREE-PORT. See the article PORT.

FREE-STATE, a republic governed by magiſtrates elected by the free ſuffrages of the inhabitants.

FREE-STONE, a whitiſh ſtone dug up in many parts of England, that works like alabaſter, but is more hard and durable; being of excellent uſe in building, &c. It is a kind of the grit-ſtone, but finer ſanded, and a ſmoother ſtone, and is called free, from its being of ſuch a conſtitution as to cut freely in any direction: ſuch is the Portland-ſtone, and the free-ſtone of Kent.

FREE-STOOL. See FRID-STOLL.

FREE-THINKER. See the article DEISTS.

FREE-WARREN, the power of granting or denying licence to any one to hunt in ſuch and ſuch ground.

FREEDOM, in general, the ſtate or quality of being free. See FREE.

FREEDOM *of a corporation*, the right of enjoying all the privileges and immunities belonging to it. See CORPORATION.

The freedom of cities, and other corporations, is regularly obtained by ſerving an apprenticeſhip; but it is alſo purchaſed with money, and ſometimes conferred by way of compliment.

FREEDOM *of the will*, that power or faculty of the mind, whereby it is capable of acting or not acting, chooſing or rejecting, whatever it judges proper. Of this every man muſt be ſenſible, who finds in himſelf a power to begin or forbear, continue or end ſeveral actions, barely by a thought or preference of the mind. The actual exerciſe of this power, is that which we call volition or willing; and the agent, capable of acting in this manner, is denominated free, and the actions he performs, voluntary. Whereas, on the other hand, wherever any performance or forbearance are not equally in a man's power; wherever doing or not doing will not equally follow upon the preference of his mind, there he is not free, though perhaps the action may be voluntary. To illuſtrate this, ſuppoſe a man to be carried whilſt faſt aſleep into a room where is a perſon he longs to ſee, and be there locked faſt in, beyond his power to get out; he awakes, and is glad to ſee himſelf in ſo deſirable company, which he ſtays willingly in; that is, prefers his ſtaying to going away. In this caſe, his ſtay is voluntary; and yet being locked faſt in, he is not at liberty to ſtay, he has not freedom to be gone. So that liberty does not conſiſt in the preference of the mind, but in the power of conforming to that preference.

FREEDOM *of contrariety*, among moraliſts, that of chooſing either of two oppoſites, as virtue or vice, good or evil; concerning which the received doctrine is, that mankind have a freedom of contradiction, but not of contrariety; that is, they may abſtain from the purſuit of virtue and good, but are incapable of hating them, or of preferring their oppoſites. See the article CONTRADICTION.

FREEDOM *of conſcience.* See TOLERATION.

FREEZE, or **FRIEZE**, in architecture. See the article FRIEZE.

FREEZE, or **FRIEZE**, in commerce, a coarſe kind of woollen ſtuff, or cloth, for winter-wear; ſo called as being freezed or napped on one ſide.

Iriſh frieze pays, on importation, a duty of $5\frac{1\frac{3}{4}}{100}$ d. for every yard; and draws back, on being exported, $4\frac{80}{100}$ d. *per* yard.

FREEZING, in philoſophy, the ſame with congelation. See the articles CONGELATION and FROST.

Philoſophers are by no means agreed as to the cauſe of this phænomenon. The carteſians account for it by the receſs or going out of the ethereal matter from the pores of the water. The corpuſcularians, on the other hand, attribute it to the ingreſs of frigorific particles, as they call them; and Hobbes aſſerts, that theſe particles are nothing elſe but common air, which entangling itſelf with the particles of water, prevents their motion. Others will have a kind of nitrous ſalt to be the cauſe of congelation, by inſinuating itſelf between the particles of water, and fixing them together like nails. And, indeed, it ſeems probable that cold and freezing do ariſe from ſome ſubſtance of a ſaline nature floating in the air; ſince all ſalts, and particularly nitrous ones, when mixed with ice and ſnow, greatly increaſe their cold, and even bulk.

Boerhaave obſerves, that it is extremely difficult to exhibit to the eye the preciſe degree of cold wherein ice begins to form; ſince heat and cold, once given to a body, adhere long to it before they quit it. When the air, therefore, is in ſuch a ſtate as keeps Fahrenheit's thermometer, at 32 degrees, water will not freeze; becauſe water being 800 times denſer than air, retains the warmth conſiderably longer than air. If any perſon therefore, is curious to know in what degree of cold water begins to freeze, let him firſt ſuſpend a thermometer in a free open air on all ſides; and then wetting a thin linen cloth with clear water, and hanging it likewiſe in the open air, it will grow ſtiff upon the firſt acceſs of the freezing cold, and thereby ſhew when water is beginning to turn to ice. See the article THERMOMETER.

By means of freezing, wine, vinegar, and malt-liquors may be reduced to a fourth part of their quantity, without any conſiderable loſs of their eſſential parts; ſince only the aqueous parts freeze, leaving the vinous parts concentrated or brought into leſs compaſs, and capable of being tranſported with leſs expence, and keeping for ſeveral years.

FREEZING MIXTURE. Mr. Boyle ſhews in his hiſtory of cold, that not only all kinds of ſalts, but likewiſe ſpirits, ſugar, and ſaccharum ſaturni, mixed with ſnow, are capable of freezing moſt fluids; and the ſame effect was alſo produced by the mixture of oil of vitriol, or ſpirit of nitre, with ſnow.

FREEZING RAIN, that which falls in form of ice, or which freezes as ſoon as it reaches the ground.

FREIGHT, or **FRAIGHT**, in navigation and commerce, the hire of a ſhip, or a part thereof, for the conveyance and carriage of goods from one port or place to another; or the ſum agreed on between the owner and the merchant, for the hire and uſe of a veſſel.

The freight of a veſſel is uſually agreed on either at the rate of ſo much for the voyage, or by the month, or per ton.

Wherever a ſhip freighted by the voyage, or by the month, is caſt away, plundered by pirates, or taken by the enemy, the freight becomes loſt; but if the merchant or any other who hires the ſhip, agrees by the tun, or after ſuch a rate for every piece of the commodities on board, and that part of the goods are ſaved, it is there held that the ſhip ought to have her freight, according to the rate of the goods ſaved. The lading of a ſhip, in law conſtruction, is bound for the freight; and where goods are put aboard, and the ſhip has broke ground, a merchant may not afterwards unlade them: for if he then changes his mind, and reſolves not to venture, by the marine law, freight is due. Likewiſe, if the freighter of a ſhip lade on board any prohibited goods, or unlawful merchandize, whereby the veſſel is detained or impeded in her voyage, he ſhall anſwer the freight agreed: but where a maſter freights out his ſhip, and afterwards takes in goods ſecretly and unknown to the firſt laders, he forfeits ſuch freight. In caſe any ſhip is freighted out and in, no freight will be due till the voyage is performed; and here if a veſſel be loſt in coming home, the freight outwards and inwards are both loſt.

If a whole veſſel be hired, and the merchant or perſon who hires it do not give it full load or burden, the maſter of the veſſel cannot, without his conſent, take in any other goods without accounting to him for freight. Though the merchant do not load the quantity of goods agreed on in the charter-party, yet he ſhall pay the whole freight; and if he load more, he ſhall pay for the exceſs. See the article CHARTER-PARTY.

The maſter may ſet aſhore ſuch goods as he finds in his veſſel, which were not notified to him; or take them at a higher rate than was agreed on for the reſt. If a ſhip be ſtopped or detained in its courſe, either through the merchant's or the maſter's fault, the delinquent ſhall be accountable to the other. If the maſter be obliged to refit his veſſel during the voyage, the merchant ſhall wait, or elſe pay the whole freight: if the veſſel could not be refitted, the maſter is obliged to hire another immediately, otherwiſe only to be paid his freight in proportion to the part of the voyage he performed: tho' in caſe the merchant prove that the veſſel, at the time it ſet ſail, was not capable of the voyage, the maſter muſt loſe his freight, and account for damages to the merchant.

Freight ſhall be paid for merchandizes which the maſter was obliged to ſell for victuals, refitting, or other neceſſary occaſions, paying for the goods at the rate the reſt were ſold at where they were landed. In caſe of a prohibition of commerce with the country whither the veſſel is bound, ſo that it is obliged to be brought back again, the maſter ſhall only be paid freight for going. And if a ſhip be ſtopped or detained in its voyage by an embargo, by order of the prince, there ſhall neither be any freight paid for the time of detention, in caſe it be hired *per* month, nor ſhall the freight be increaſed, if hired by the voyage: but the pay and victuals of the ſailors, during the detention, ſhall be deemed average. See the article AVERAGE.

FREIGHT is alſo uſed for the burden or lading of a ſhip, or the cargo of goods, *&c.* which ſhe has on board.

FREIGHT alſo ſignifies a duty of fifty ſols *per* ton paid to the crown of France by the maſters of foreign veſſels going in or out of the ſeveral ports of the kingdom. It is to be obſerved, that all veſſels not built in France, are accounted foreign, though belonging to the king's ſubjects; and, as ſuch, are liable to the payment of this impoſt, unleſs otherwiſe exempted, or that two thirds of the crew are French. The Dutch and the hans towns are exempted from the duty of freight.

FRENCH, in general, ſomething belonging to France: thus we ſay, the french language, french cuſtoms, polity, *&c.* The french language is made up of latin, greek, teutonic, and the language ſpoken by the old Gauls. It is natural, and eaſily pronounced, and therefore uſed by moſt nations of Europe in converſing with foreigners. There are very few compound words in french, which is acknowledged to be to its diſadvantage. It has alſo few diminutives; but as to purity, eaſineſs, and flexibility, it yields to none.

FRENCH BREAD.	See	BREAD.
FRENCH COINS.		COIN.
FRENCH CROWN.		CROWN.
FRENCH WEIGHT, *&c.*		WEIGHT.

FRENUM, or **FRÆNUM**, in anatomy. See the article FRÆNUM.

FRENZY, **PHRENZY**, or **PHRENSY**, in medicine. See the article PHRENSY.

FRESCO, a method of painting in relievo on walls, ſo as to endure the weather.

It is performed with water-colours on freſh plaſter; and on a wall laid with mortar not yet dry. This ſort of painting has a great advantage by its incorporating with the mortar, and, drying along with it, becomes very durable.

The compoſt ſhould be made of rubbiſh ſtones mixt with well-burnt flint, or lime, and water: but the ſaltneſs of the lime muſt be waſhed out, by pouring water frequently on it. But this ſhould not be done in moiſt weather.

To prevent the plaſter from peeling, ſtrike into the joints of the wall ſtumps of horſe-nails ſix inches diſtant from each other. Firſt plaſter the walls pretty thick; then let it dry for ſome time, the deſigns and colours being firſt ready prepared. This painting is chiefly performed on walls and vaults newly plaſtered with lime and ſand; and the plaſter is only to be put on in proportion as the painting proceeds.

Plaſter the wall a ſecond time, about the thickneſs of half a crown, only ſo much as you intend to work upon; and while it is wet, work the colours therein, which will incorporate with the plaſter ſo as never to waſh out.

The painting muſt be worked with a free hand, and your colours made high enough at firſt, as there can be no alteration made after the firſt painting.

In this work ſcarce any thing elſe is uſed but earths, which ſtill retain their colour, defending it from the burning and ſalt of the lime. The colours are white, made of lime ſlacked ſome time, and white marble duſt, red and yellow oker, violet red, verditer, lapis lazuli, ſmalt, black ſpaniſh brown, ſpaniſh white, *&c.* all which are ground and worked up with water.

The bruſhes and pencils for this work muſt be long and ſoft, or elſe they will rake and raze the painting: the colours muſt be full and flowing from the bruſh, and the deſign or cartoon muſt be perfect in the paper copy.

The antients painted on ſtucco; and we may remark in Vitruvius what infinite care they took in making the incruſtations or plaſtering of their buildings, to render them beautiful and laſting; tho' the modern painters find a plaſter made of lime and ſand preferable thereto.

FRESH, in general, ſomething that is new, pure, and good; or, that has little or no ſalt in it.

FRESH DISSEISIN, in law, ſuch a diſſeiſin as a man may defeat of himſelf, and by his own power, without the aſſiſtance of the king or the law; as where it is of ſhort continuance, *viz.* not above fifteen days. See the article DISSEISIN.

FRESH FINE, a fine that was levied within a year paſt. See the article FINE.

FRESH FORCE, ſignifies a force newly done; as where a perſon is diſſeiſed of any lands or tenements within a city or borough, or deforced of lands after the deceaſe of his anceſtor, to whom he is heir; the perſon having right may within forty days after the force committed, or title to him accrued, bring his aſſiſe or bill of freſh force, and recover the lands. See the article FORCE.

FRESH HAWSE, among ſeamen. See the article HAWSE.

FRESH SHOT, in the ſea-language, ſignifies the falling down of any great river into the ſea, by means whereof the ſea hath freſh water a good way from the mouth of the river. As this is more or leſs, they call it a great or ſmall freſh ſhot.

FRESH SPELL, in the ſea-phraſe, a freſh gang to relieve the rowers in the long-boat.

FRESH SUIT, in law, is ſuch a cloſe and active proſecution of an offender, as never ceaſes from the time of the offence committed or diſcovered, till he is apprehended.

The benefit and effect of this purſuit of a felon is, that the party purſuing ſhall have his goods again, which otherwiſe would be forfeited to the king. A perſon may be ſaid to make a freſh ſuit tho' he does not take the thief preſently, but ſome time after the robbery is committed, provided he has uſed his utmoſt endeavours to take him; and though the criminal was taken by another perſon not intereſted in any thing carried away, yet the party robbed ſhall be deemed to have made a freſh ſuit.

FRESH WATER. See the article WATER.

FRET, or **FRETTE**, in architecture, a kind of knot or ornament, conſiſting of two liſts or ſmall fillets variouſly interlaced or interwoven, and running at parallel diſtances equal to their breadth. See plate CVI. fig. 3.

Every return and interſection of theſe frets muſt be at right angles, otherwiſe they loſe all their beauty, and become perfectly gothic. Sometimes the fret conſiſts but of a ſingle fillet, which, if well diſpoſed, may be made to fill its ſpace exceedingly well. Frets were very much uſed by the antients, eſpecially on even flat members, or parts of a building, as the faces of the corona, and eves of corniches; under the roofs, ſoffits, &c. and on the plinths of baſes, &c.

FRET, in heraldry, a bearing compoſed of ſix bars, croſſed, and variouſly interlaced, as repreſented in plate CVII. fig. 2.

Some call it the true-lover's knot.

FRET, in muſic, ſignifies a kind of ſtop on ſome inſtruments, particularly baſs-viols and lutes. Frets conſiſt of ſtrings tied round the neck of the inſtrument, at certain diſtances, within which ſuch and ſuch notes are to be found.

FRET-WORK, that adorned with frets. It is ſometimes uſed to fill up and enrich flat empty ſpaces; but is moſtly practiſed in roofs, which are fretted over with plaſter-work. The Italians alſo uſe fret-works in the mantling of chimneys, with great figures: a cheap piece of magnificence, and as durable almoſt within doors, as harder matters in the weather.

FRETTY, in heraldry, an appellation given to bearings made up of ſix, eight, or more bars laid acroſs each other, in the manner of frets. See FRET.

FREYSTAT, a town of Sileſia, in Germany, eaſt long. 17° 55′, north lat. 50°.

FRIABLE, among naturaliſts, an appellation given to bodies that are eaſily crumbled to pieces: ſuch are the free-ſtone, pumice-ſtone, &c.

FRIAR, or FRIER, from the French *frere*, a brother, a term common to monks of all orders, founded on this, that there is a kind of fraternity, or brotherhood, between the ſeveral religious perſons of the ſame convent or monaſtery.

Friars are generally diſtinguiſhed into theſe four principal branches, *viz.* 1. Minors, grey friars, or franciſcans. 2. Auguſtins. 3. Dominicans, or black friars. 4. White friars, or carmelites. From theſe four the reſt of the orders deſcend. See the articles FRANCISCAN, AUGUSTINS, &c.

FRIAR, in its more peculiar and proper ſenſe, is reſtrained to ſuch monks as are not prieſts, for thoſe in orders are generally dignified with the title of father.

FRIAR OBSERVANT, is a branch of the franciſcan friars; thus called, becauſe they are not combined together in any cloiſter, convent or corporation, as the conventuals are; but have bound themſelves only to obſerve the rules of their order more ſtrictly than the conventuals *do*, from whom they ſeparated, out of a ſingularity of zeal, living in certain places of their own chooſing.

FRIAR'S COUL, in botany, a name given to ſeveral ſpecies of arum. See the article ARUM.

FRIBURG, the capital of a canton of the ſame name in Switzerland, ſituated eighteen miles ſouth-weſt of Bern: eaſt long. 6° 55′, north lat. 46° 50′.

FRIBURGH, a city of Swabia, in Germany, twenty-eight miles ſouth of Straſburg.

FRIBURGH, or **FRIDBURGH**, in our old cuſtoms, the ſame with frank pledge. See the article FRANK.

FRICASSEE, in cookery, a diſh haſtily dreſſed in a frying-pan, with butter, oil, or the like. Thus we ſay, a fricaſſee of pullets, tripe, eggs, &c.

FRICENTO, a town and biſhop's ſee of Italy, forty-three miles eaſt of the city of Naples.

FRICTION, in mechanics, the rubbing of the parts of engines and machines againſt each other, by which means a great part of their effect is deſtroyed.

It is hardly poſſible to lay down general rules concerning the quantity of friction; ſince it depends upon a multiplicity of circumſtances, as the ſtructure, firmneſs, elaſticity, &c. of the bodies rubbing againſt each other. Some authors make friction, upon an horizontal plane, equal to one third of the weight to be moved; whilſt others have found it to be conſiderably leſs.

Be this as it will, the doctrine of friction as aſcertained by the lateſt experiments, may be ſummed up in the following manner. 1. When one body inſiſts on another upon a horizontal plane, it preſſes it with its whole weight; which being equally re-acted on, and conſequently the whole effect of its gravity deſtroyed by the plane, it will be abſolutely free to move in any horizontal direction by any the leaſt power applied thereto, provided both the touching ſurfaces be perfectly ſmooth. 2. But ſince we find no ſuch thing as perfect ſmoothneſs in the ſurfaces of bodies, but an evident roughneſs or unevenneſs of the parts in their ſurface, ariſing from their poroſity and peculiar texture, it is eaſy to underſtand that when two ſuch ſurfaces come together, the prominent parts of one will, in ſome meaſure, fall into the concave parts of the other; and, therefore, when an horizontal mo-

Fig. 1. The SIBERIAN Fox.

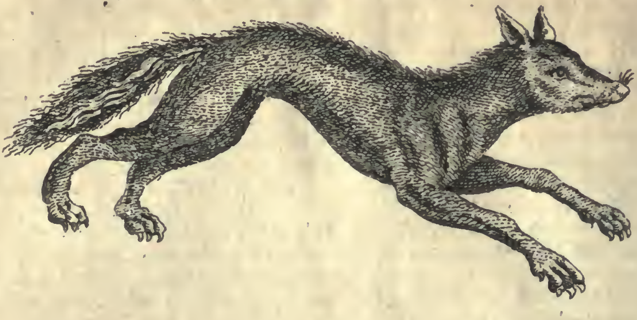
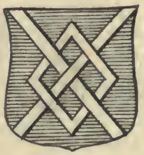


Fig. 2. FRET.



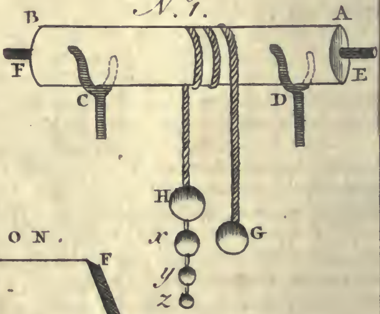
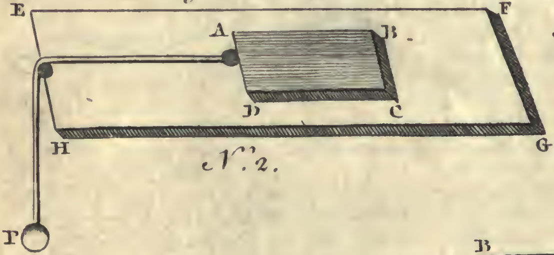
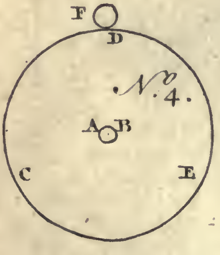
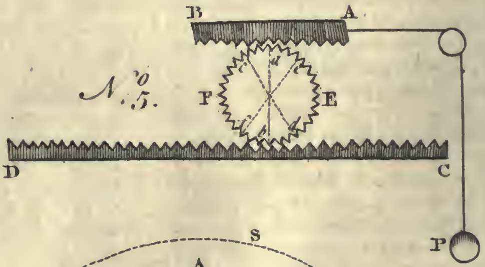


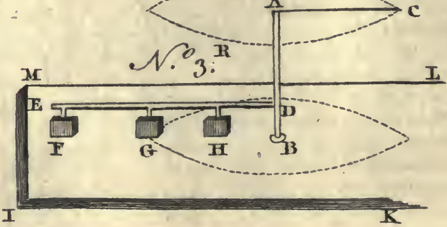
Fig. 3. FRICTION.



N.° 2.







T. Jefferys sculp

tion is attempted in one, the fixed prominent parts of the other will give more or leſs reſiſtance to the moving ſurface, by holding and detaining its parts; and this is what we call friction. 3. Now ſince any body will require a force proportional to its weight to draw it over a given obſtacle, it follows that the friction ariſing to the moving body will always be in proportion to its weight only, and not the quantity of the ſurface, by which it bears upon the reſiſting plane or ſurface. Thus if a piece of wood four inches wide, and one thick, be laid upon another fixed piece of the ſame wood, it will require the ſame weight to draw it along, whether it be laid on its broad or narrow ſide. 4. For tho' there be four times the number of touching particles on the broad ſide (cæteris paribus) yet each particle is preſſed with but $\frac{1}{4}$ of the weight that thoſe are on the narrow ſide; and ſince four times the number, multiplied by $\frac{1}{4}$ of the weight, is equal to $\frac{1}{4}$ of the number multiplied by four times the weight, it is plain the reſiſtance is equal in both caſes, and ſo requires the ſame force to overcome it. 5. The reaſon why friction is proportional to the weight of the moving body, is, becauſe the power applied to move the body, muſt raiſe it over the prominent parts of the ſurface on which it is drawn; and this motion of the body, as it is not upright, ſo it will not require a power equal to its whole weight; but being in the nature of the motion on an inclined plane, it will require only a part of its own weight, which will vary with the various degrees of ſmoothneſs and aſperity. 6. It is found by experiment, that a body will be drawn along by nearly one third of its weight; and if the ſurface be hard and well poliſhed, by leſs than a third part; whereas, if the parts be ſoft or rugged, it will require a much greater weight. Thus alſo the cylinder of wood A B, (plate CVII. fig. 3. n° 1.) if very ſmooth, and laid on two well poliſhed ſupporters, C, D, (having been firſt oiled or greaſed) and then charged with the weight of two pounds in the two equal balls, G, H, it will require an additional weight x, equal to about a third part of the two pounds, to give motion to, or overcome the friction of the ſaid cylinder. 7. Now this additional weight, as it cauſes a greater weight of the cylinder, will likewiſe encreaſe the friction, and therefore require the addition of another weight y, equal to the third part of its own weight: for the ſame reaſon, the weight y will require another z, a third part leſs; and ſo on, *ad infinitum.* Hence, ſuppoſing the friction to be preciſely a third of the weight, the firſt weight with all the additional ones, *viz.* 2, $\frac{2}{3}$, $\frac{2}{9}$, $\frac{2}{27}$, &c. will be a ſeries of numbers in geometrical progreſſion, decreaſing. Now the ſum of all theſe terms, except the firſt, is found, by a well known theorem in arithmetic, to be equal to one pound. So that if the weight of the cylinder be inconſiderable, the readieſt way to overcome the friction, would be to double the power G, or H, at once. 8. But tho' we may, at a medium, allow a third part of the weight with which any ſimple machine is charged, for the friction ariſing from thence; yet this is very precarious, and ſeldom is the caſe: for if A B C D (*ibid.* no° 2.) be a piece of braſs of ſix ounces, and E F G H be alſo a plate of braſs, and both the ſurfaces well ground and poliſhed, the weight P of near two ounces will be required to draw along the body A C alone; but if A C be loaded with 6, 8, or 10 ℔. then a ſixth part of the weight will be ſufficient to draw it along the plane. On the other hand, if the plane be covered with a linen or woollen cloth, then a third, or half part, and ſometimes more, will be requiſite to draw it along on the plane. 9. Yet notwithſtanding the difficulty and uncertainty attending the eſtimation of the quantity of friction, it is ſtill a moſt uſeful and neceſſary enquiry, how, and by what means the friction of any machine may be diminiſhed. In order to this, we muſt conſider friction mechanically, or as a force acting againſt a power applied to overcome it. Thus ſuppoſe A B (*ibid.* n° 3.) an upright ſtem or ſhaft, turning freely in the ſocket B fixed in the table or plane I K L M; and A C, D E, two arms fixed in the ſaid ſhaft, the latter of which, D E, has three pins going into a ſocket in the middle of heavy weights, F, G, or H, in ſuch a manner, that when a power applied at C moves the lever A C, it cauſes the lever D E to protrude or thruſt along the weights at F, G, or H, in a circular manner upon the table. 10. Now ſince we ſuppoſe the weight, all the while it is in motion, is freely and wholly ſupported by the plane, it follows that all the reſiſtance it can give to the power applied at C, is only what ariſes from its friction on the plane. What this friction is, will be found by applying the weight at G, ſo that B G be equal to A C; for then the power applied to C, acting in a tangent to the circle C R S, that ſhall juſt move the weight G, will be equal to its friction. But if the weight be applied at F, becauſe B F is greater than A C, the ſame power at C, as before, will not move it, by reaſon its force is here increaſed by having a greater velocity than the power; as, on the other hand, if placed at H, a leſs power at C ſhall move it, becauſe of its having there leſs velocity than the power, as is evident from the properties of the lever. 11. Hence we underſtand, that though the weight of a machine remains the ſame; yet the friction may be diminiſhed, by contriving that the parts, on which it moves and rubs, ſhall have leſs velocity than the power which moves it: thus, if the cylinder A B (*ibid.* n° 1.) were to move on the two ſmall pins or gudgeons E, F, the friction would be abated in the proportion of the diameter of the cylinder to that of the pins. 12. The friction on theſe gudgeons is ſtill farther diminiſhed by cauſing them to move on the circumference of a wheel: thus, let F be the gudgeon of a cylinder, revolving on the wheel C D E (*ibid.* n° 4.) the velocity of the wheel's circumference will be the ſame with that of the gudgeon; but the velocity of the wheel's axis A B (which is now to be conſidered as the rubbing part) is leſs than that of the wheel, in proportion as its diameter is leſs than that of the wheel: for example, if the friction of the cylinder moving on its ſurface, be $\frac{1}{3}$ part of the weight, and the gudgeon be to the cylinder as 1 : 10, they will reduce the friction to $\frac{1}{30}$ part; and if, again, the axis of the wheel be to the wheel as 1 : 10, the wheel will reduce the friction to $\frac{1}{300}$ part; and if the axis of this wheel be laid on the perimeter of another wheel, the friction will be reduced to a ſtill leſſer part of the weight; ſo that you may proceed in this manner to diminiſh the friction *ad infinitum*; and wheels applied in this manner, are called friction-wheels. 13. Beſides what has been already ſaid, ſomewhat farther is neceſſary to diminiſh the friction of wheel-carriages. It was before obſerved, that friction aroſe chiefly by lifting the body over the prominent parts of the plane on which it is moved; now if we can contrive to move the body along without lifting or ſuſtaining its weight, we ſhall move it without much friction; and this may be done by laying the body on any moveable circular ſubject, as rollers, wheels, *&c.* thus let A B (*ibid.* n° 5.) be the ſection of an heavy body, laid on a roller E F, upon the plane C D, and drawn by the power P; it is evident, when A B moves, the aſperities of its ſurface will lay hold on thoſe of the roller, and move it likewiſe; and it is as evident that when the body A B is drawn againſt the prominent parts of the roller, they immediately give way, and make no reſiſtance: thus the perpendicular diameter *a b* yields into the ſituation *e f*, and *c d* ſucceeds in its place. By this circular motion of the roller, its prominent parts below do only deſcend and move upon or over, and are not drawn againſt the fixed prominent parts of the plane and ſo receive no reſiſtance from them. Hence the body A B is conveyed along, without being lifted up, in the ſame manner as a wheel is moved by a pinion, without any conſiderable reſiſtance. And this is the true foundation of the doctrine of wheel-carriages. See the article WHEEL-CARRIAGES.

FRICTION, in medicine, the rubbing a diſeaſed part, either with or without unguents, oils, *&c.* Dr. Cheyne greatly recommends friction with a fleſh-bruſh, to perſons of weak nerves and ſedentary lives; by which means a full and free perſpiration would be promoted, and obſtructions removed, to the great relief of many valetudinarians.

FRIDAY, the ſixth day of the week, ſo called from Friga, a goddeſs worſhipped by the Saxons on this day.

Every Friday throughout the year, in the church of England, is a faſt, (except Chriſtmas-day, which, even though it happen on a Friday, is always a feſtival,) in compliance with the cuſtom of the primitive church, which always obſerved this as a faſt, in commemoration of our Saviour's crucifixion. It was one of their ſtationary days, when they uſually forbore eating till three o'clock in the afternoon.

Good-FRIDAY, a faſt of the chriſtian church, in memory of the ſufferings and death of Jeſus Chriſt, obſerved on the holy, or paſſion-week, and called good, by way of eminence, becauſe of the bleſſed effects of our Saviour's ſufferings, which were a propitiatory and expiating ſacrifice for the ſins of the world. See the article PASSION-WEEK.

On Good-Friday the pope ſits on a plain form, and after ſervice is ended, when the cardinals wait on him back to his chamber, they are obliged to keep a deep ſilence as a teſtimony of their ſorrow. In the night of Good Friday, the Greeks perform the obſequies of our Saviour round a great crucifix laid on a bed of ſtate adorned with flowers; theſe the biſhops diſtribute among the aſſiſtants, when the office is ended. The Armenians, on this day, ſet open a holy ſepulchre, in imitation of that on mount Calvary.

FRIDBURG, an imperial city of Bavaria, in Germany: eaſt longitude 11°, and north lat. 48° 30′.

FRIDBURG is alſo the name of two other towns in Germany, both ſituated in the circle of Upper Saxony, the one nine miles ſouth-weſt of Dreſden, and the other thirty miles weſt of Leipſic.

FRIDLAND, a town of Bohemia, on the confines of Luſatia: eaſt long. 15° 5′, and north lat. 50°. 55′.

FRIDLINGEN, a town of Swabia, in Germany: eaſt long. 7° 30′, and north lat. 47° 35′.

FRIDSTOL, mentioned in our antient writers, among the immunities granted to churches, ſignifies a ſeat, chair, or place of peace and ſecurity, where criminals might find ſafety and protection: of theſe there were many in England, but the moſt famous was at Beverley, and that in St. Peter's church at York, granted by charter of king Henry I.

FRIEDBURG, an imperial city of Germany, ſixteen miles north of Francfort on the Main.

FRIENDLESS MAN, an old Saxon term for an outlaw.

FRIER, or FRIAR. See FRIAR.

FRIESLAND, one of the moſt northern provinces of the United Netherlands, bounded by the German ocean on the north, by Groningen and Overyſſel on the eaſt, by the Zuider-ſea and Overyſſel on the ſouth, and by the ſame ocean on the weſt: Its chief town is Lewarden.

Eaſt-FRIESLAND, a province of Weſtphalia, in Germany, being the north weſt part of Germany, bordering on Groningen.

FRIEZE, FREEZE, or FRIZE, in architecture, a large flat face, or member, ſeparating the architrave from the corniche, being that part of the entablature between the architrave and corniche. See the articles ARCHITRAVE, CORNICHE, and ENTABLATURE.

This member was by the antients called zoophorus, becauſe it was commonly enriched with the figures of animals. The frieze is ſuppoſed to be deſigned to repreſent the heads of the tranſverſe beams, which ſuſtain the roof or covering.

In the tuſcan order it is quite plain, but is enriched with triglyphs in the doric; it is ſometimes made arched or ſwelling in the ionic: in the corinthian and compoſite it is frequently joined to the architrave by a little ſweep, and ſometimes to the corniche; and in theſe richer orders, it is commonly adorned with ſculpture, figures, compartments, hiſtories, foliages, feſtoons, &c. See the articles TUSCAN, DORIC, IONIC, &c.

As to the height of the frieze, it is in general much the ſame as that of the architrave. The height of the tuſcan frieze, according to Vitruvius, who makes it flat and plain, is 30 minutes; but Palladio, who makes it convex and ſwelling, gives it only 26; Scamozzi makes it plain, but raiſes the height to 42 minutes. Vitruvius and Vignola, who make the doric frieze flat, only covered with triglyphs give it the height of 30 or 40 minutes: but Palladio and Scamozzi make it 45. The ionic frieze, according to Vitruvius, who makes it flat, only carved with acanthus leaves, &c. is 30 minutes in height; Vignola makes it 45, and flat like Vitruvius: Palladio, who makes it convex and ſwelling, calls the height 27; and Scamozzi 28. The height of the corinthian frieze, according to Vitruvius, who enriches it with acanthus-leaves, human figures, &c. is 37 minutes; but Vignola makes it 45; Palladio, 28; and Scamozzi $31\frac{3}{4}$. Laſtly, the compoſite frieze, which, in Vitruvius, is ſet with cartouſes, and carved between them, is, according to that writer, $52\frac{1}{2}$ minutes high; but Vignola, who makes it like Vitruvius, gives it but 45 minutes; Palladio, who makes it ſwelling, has but 30; Scamozzi, 32.

From the variety of their ornaments, friezes obtain various denominations.

Convex or *Pulvinated* FRIEZES, ſuch whoſe profile is a curve, the beſt proportion of which is when drawn on the baſe of an equilateral triangle.

In ſome the ſwelling is only at top, as in a conſole; in others at bottom, as in a balluſter. See the articles CONSOLE and BALLUSTER.

Flouriſhed FRIEZES, ſuch as are enriched with rinds of imaginary foliages, as the corinthian frieze of the frontiſpiece of Nero: or with natural leaves, either in cluſters or garlands; or continued, as in the ionic of the gallery of Apollo in the Louvre.

Hiſtorical FRIEZES, ſuch as are adorned with baſs relievos, repreſenting hiſtory, ſacrifices, &c. as the arch of Titus at Rome.

Marine FRIEZES, ſuch as repreſent ſea-horſes, tritons, and other attributes of the ſea, as ſhells, baths, grottos, &c.

Ruſtic FRIEZES, ſuch whoſe courſes are ruſticated or emboſſed, as in the tuſcan frieze of Palladio.

Symbolical FRIEZES, thoſe adorned with the attributes of religion, as the corinthian of the temple behind the Capitol at Rome, whereon are repreſented the inſtruments and apparatus of ſacrifice.

FRIEZE *of the capital.* See the article HYPOTRACHELION.

FRIEZE, or FREEZE, in commerce. See FREEZE and FRIZING.

FRIGAT, among ſeamen, a ſhip of war, light built, and that is a good ſailer.

A frigat has commonly two decks, whence that called a light frigat, is a frigat with only one deck.

FRIGATOON, a venetian veſſel, commonly uſed in the Adriatic ſea, with a ſquare ſtern, and carrying only a main-maſt, mizen, and bowſprit.

FRIGID is applied to a jejune ſtyle, that is unanimated by any ornaments, and conſequently without any force or vigour.

FRIGID ZONE, in geography. See the article ZONE.

FRIGORIFIC, in phyſiology, ſmall particles of matter, which, according to Gaſſendus and others, being actually and eſſentially cold, and penetrating other bodies, produce in them that quality which we call cold. See COLD.

FRILL, in falconry. When a hawk trembles, or ſhivers, they ſay, ſhe frills.

FRINGILLA, in ornithology, a comprehenſive genus of birds, of the order of the paſſeres, with the beak of a conic ſharp-pointed figure, the two chaps of which mutually receive each other.

To this genus belong the gold-finch, chaff-finch, green-finch, yellow-hammer, canary-bird, linnet, ſparrow, &c. See the articles GOLD FINCH, &c.

FRINGILLAGO, a name given by ſome authors to the parus or titmouſe. See the article TITMOUSE.

FRINGILLARIUS, ACCIPITER, the name by which authors call the ſparrow-hawk. See the article HAWK.

FRINWALT, or FRIDLAND, a town of Brandenburg, thirty miles north-eaſt of Berlin, ſituated on the weſt-ſide of the river Oder.

FRIO, a cape or promontory of Braſil: weſt longitude 44°, and ſouth latitude 23° 30′.

FRIPPERY, a french term ſometimes uſed in our language to ſignify the trade or traffic of old ſecond-hand cloaths and goods. The word is alſo uſed for the place where ſuch ſort of commerce is carried on, and even for the commodities themſelves. The company of frippiers, or fripperers, at Paris, are a regular corporation, of an antient ſtanding, and make a conſiderable figure in that city.

FRISACH, a town of Bavaria, ſixty miles ſouth-eaſt of Saltzburg: eaſt long. 14° 15′, and north lat. 47° 20′.

FRISELAND, or FRIESLAND. See the article FRIESLAND.

FRISONE, in ornithology, the ſame with the coccothrauſtes, or loxia. See the article LOXIA.

FRIST in the mercantile ſtyle, ſignifies ſelling goods upon credit, or truſt.

FRIT, in the glaſs-manufacture, the matter or ingredients whereof glaſs is to be made, when they have been calcined or baked in a furnace; or it is the calcined matter to be run into glaſs. See the article GLASS.

There are three kinds of frit; the firſt, that made for cryſtal; the ſecond, or ordinary frit, is that made for the common white or cryſtalline metal; and the third, that made for green-glaſs.

The frit for cryſtal is made as follows: take 200 ℔ of tarſo, powdered fine, and ſifted; of the ſalt of polverine 130 ℔; mix them well together, and put them into the calcar, a ſort of oven, or reverberatory furnace, which ſhould be firſt well heated: here let them remain, baking, frying, and calcining, for five hours, during which the workman keeps mixing them with a rake, to make them incorporate. The ſecond, or ordinary frit, is made of bare aſhes of polverine, without extracting the ſalt from them. The third, for green glaſs, is made of common aſhes, without any preparation.

It may be obſerved, that glaſs might be made by immediately melting the materials,

rials, without this calcining and making them into frit; but the operation would be much more tedious.

FRITH, in its moſt uſual acceptation, ſignifies an arm of the ſea: ſuch are the frith of Forth or of Edinburgh, the frith of Clyde, Murray frith, *&c.*

FRITH, among lawyers, ſignifies a lawn or plain between two woods.

FRITH-GILD, a term antiently uſed for what is now called a guild-hall, or a company of ſome corporation: and frithman was one free of ſuch company. See GUILDHALL and COMPANY.

FRITH is alſo uſed to ſignify peace. Hence

FRITH-SOKE, or FRITH-SOKEN, a term formerly uſed to ſignify a ſurety of defence.

FRITILLARIA, fritillary, in botany. See the next article.

FRITILLARY, *fritillaria*, in botany, a genus of the hexandria monogynia claſs of plants, the corolla of which is compoſed of ſix companulated, oblong, and parallel petals, with a broad baſe; the fruit is an oblong, obtuſe, trilobate capſule, formed of three valves, and containing three cells; the ſeeds are numerous, plane, ſemiorbiculated externally, and placed in a double row.

Thick FRITILLARY, *fritillaria craſſa*, in botany, the ſame with the aſclepias. See the article ASCLEPIAS.

FRIULI, a province of Italy, ſubject to Venice, and bounded by Carinthia in Germany on the north, by Carniola on the eaſt, by the gulph of Venice on the ſouth, and by the Belluneſe and Feltrin on the weſt.

FRIZE, or FRIEZE, in architecture. See the article FRIEZE.

FRIZE, or FREEZE, in commerce. See the article FREEZE.

FRIZING *of cloth*, a term, in the woollen manufactory, applied to the forming of the nap of a cloth, or ſtuff, into a number of little hard burrs or prominences, covering almoſt the whole ground thereof. See the article FREEZE.

Some cloths are only freezed on the backſide, as black cloths; others on the right ſide, as coloured and mixed cloths, rateens, bays freezes, *&c.*

Frizing may be performed two ways; one with the hand, that is, by means of two workmen, who conduct a kind of plank that ſerves for a frizing inſtrument. The other way is by a mill, worked either by water, or a horſe, or ſometimes by men. This latter is eſteemed the better way of frizing, by reaſon the motion being uniform and regular, the little knobs of the frizing are formed more equably and regularly. The ſtructure of this uſeful machine is as follows.

The three principal parts are the frizer or criſper, the frizing-table, and the drawer, or beam. The two firſt are two equal planks or boards, each about ten feet long, and fifteen inches broad, differing only in this, that the frizing-table is lined or covered with a kind of coarſe woollen ſtuff, of a rough ſturdy nap; and the frizer is incruſtated with a kind of cement compoſed of glue, gum arabic, and a yellow ſand, with a little aqua vitæ or urine. The beam, or drawer, thus called becauſe it draws the ſtuff from between the frizer and the frizing-table, is a wooden roller, beſet all over with little, fine, ſhort points, or ends of wire, like thoſe of cards uſed in carding of wool.

The diſpoſition and uſe of the machine is thus: the table ſtands immoveable, and bears or ſuſtains the cloth to be frized, which is laid with that ſide uppermoſt on which the nap is to be raiſed: over the table is placed the frizer, at ſuch a diſtance from it as to give room for the ſtuff to be paſſed between them, ſo that the frizer, having a very ſlow ſemicircular motion, meeting the long hairs or naps of the cloth, twiſts and rolls them into little knobs or burrs, while, at the ſame time, the drawer, which is continually turning, draws away the ſtuff from under the frizer, and winds it over its own points.

All that the workman has to do while the machine is a going, is to ſtretch the ſtuff on the table, as faſt as the drawer takes it off; and from time to time to take off the ſtuff from the points of the drawer. The deſign of having the frizing-table lined with ſtuff of a ſhort, ſtiff, ſtubby nap, is that it may detain the cloth between the table and the frizer long enough for the grain to be formed, that the drawer may not take it away too readily, which muſt otherwiſe be the caſe, as it is not held by any thing at the other end. It were unneceſſary to ſay any thing particular of the manner of frizing ſtuffs with the hand, it being the aim of the workmen to imitate, as near as they can, with their wooden inſtrument, the ſlow, equable, and circular motion of the machine: it needs only be added, that their frizer is but about two feet long and one broad; and that, to form the nap more eaſily they moiſten the ſurface of the ſtuff lightly, with water mingled with whites of eggs or honey.

FROBISHER's STRAITS, in weſt Greenland, lie a little to the northward of cape Farewel: weſt long. 48°, and north lat. 63°.

FRODINGHAM, a market town of Yorkſhire, thirty miles eaſt of York.

FRODSHAM, a market-town of Cheſter, fourteen miles north-eaſt of Cheſter.

FROG, *rana,* in zoology, a genus of amphibious animals, the body of which is broad and ſhort, without a tail, and furniſhed with four legs.

Beſides the common frog, there are a great many other ſpecies, the moſt ſingular of which is that called the bull-frog, a native of the northern parts of America, with four divided toes on the fore-feet, and five webbed ones on the hinder. This, when the limbs are extended, meaſures near two feet; the trunk of its body being about eight inches long, and four or five in breadth: it is very voracious, and frequently ſwallow young ducks, and other water fowl, before they have ſtrength to ſhift for themſelves. Its croaking is ſo loud as to reſemble the roaring of a bull heard at a diſtance, whence its name of bull frog. There is alſo another very extraordinary ſpecies of frog, called the tree-frog, from its living on trees and plants of various kinds: alſo the green frog, from its colours; its body is about an inch and a half long.

FROG, among farriers, the ſame with fruſh. See the article FRUSH.

FROG-FISH, the rana piſcatrix of authors. See the article RANA PISCATRIX.

FROME, a market-town of Somerſetſhire, nine miles ſouth of Bath.

FRONDES, among botaniſts, denote leaves conſiſting of ſeveral other leaves, and forming the whole of the plant; as is the caſe of the fern-kind, in which, the fructification being on the back of the leaves, the ſingle leaf makes the whole plant, and is called frondis, not folium.

FRONT *of a battalion,* among military men, is the firſt rank, or file-leaders. It is likewiſe called the face or head of a battalion. In like manner,

FRONT *of a ſquadron,* is the firſt rank of troopers.

FRONT *of a camp,* the foremoſt row of tents in the firſt line, which are the quarter-maſters tents in the horſe, and ſerjeants in the foot.

FRONT *of an army* conſiſts of a certain number of ſquadrons and battalions.

FRONT *of a place,* or the TENAILLE, in fortification, all that is contained between the flanked angles of the two neighbouring baſtions, *viz.* the two faces, two flanks, and the curtin.

FRONT, in architecture, the principal face or ſide of a building, or that which is preſented to the chief aſpect or view.

FRONT, in perſpective, a projection or repreſentation of the face or forepart of an object, or of that part directly oppoſite to the eye, which is more uſually called the orthography. See ORTHOGRAPHY.

Line of the FRONT. See the article LINE.

FRONT SCALE. See the article SCALE.

FRONTAL, in architecture, a little fronton, or pediment, ſometimes placed over a little door, or window.

FRONTAL, or FRONTLET, or BROW-BAND, is alſo uſed in ſpeaking of the jewiſh ceremonies.

This frontal conſiſts of four ſeveral pieces of vellum, on each whereof is written ſome text of ſcripture: they are all laid on a piece of calf's leather, with thongs to tie it by.

The Jews apply the leather with the vellum on their foreheads in the ſynagogue, and tie it round the head with the thongs.

FRONTALE OS. See FRONTIS OS.

FRONTALE, in medicine, a name for any external medicine, or topic, applied to the forehead: more particularly it means a refrigerating and hypnotic remedy, prepared of cold cephalics, bruiſed and tied up in a linen bag, four or five fingers breadth.

FRONTAL MUSCLES, in anatomy, two of the four muſcles of the cutis of the cranium. See the article SKULL.

The frontal muſcles are very thin; they are ſituated under the ſkin of the forehead, and have both their extremities moveable, excepting only for a few fibres, which ariſe from the inferior edge of the os frontis. They are extended on each ſide under the eye-lids, near the larger canthus of the eye, beyond the middle of the orbit, towards the leſſer canthus; and extended ſomewhat obliquely outwards over the os frontis: after this, they expand their tendons over the upper part of the cranium, and ſeem to be joined with the aponeuroſes of the occipitales, which are fixed. By this means they are able to move the ſkin of the forehead and eye-brows. The antagoniſts to theſe are the orbiculares palpebrarum, on which they are affixed. See ORBICULARIS.

FRONTATED, a term uſed by botaniſts relating to the leaf of a flower, which grows broader and broader, perhaps terminating in a right line: and is uſed in oppoſition to cuſpidated, that is, when the leaves of the flower end in a point.

FRONTEIRA, a town of Portugal, in the province of Alentejo: weſt lon. 8° 6′, and north lat. 38° 50′.

FRONTIER, the border, confine, or extremity of a kingdom or province, which the enemies find in front, when they would enter the ſame: thus we ſay, a frontier town, a frontier province, *&c.* Frontiers were antiently called marches.

FRONTIS OS, in anatomy, called alſo os coronale, the bone of the forehead. See the article FACE.

This is a bone of the cranium, of an irregular form, double in infants, but in adults uſually ſingle: ſometimes, however, it is divided in theſe into two parts down to the noſe. It is ſituated in the anterior part of the ſkull, and forms that part of the face which is called the forehead, from whence it has its name. Its figure is ſymmetrical, reſembling a large ſhell, almoſt round. See SKULL.

The os frontis is articulated, by ſuture, to ſeven other bones; the oſſa parietalia, os ethmoides, os ſphenoides, oſſa lachrymalia, oſſa naſi, maxillaria, and the oſſa malarum. See the articles SUTURE, PARIETALIA OSSA, *&c.*

The os frontis contains the anterior lobes of the brain, and a portion of the longitudinal ſinus; and forms the forehead, the upper part of the orbits, and a portion of the temples. See BRAIN.

In the internal ſurface of the os frontis there is a fovea, or furrow, and an eminence, to which the longitudinal ſinus of the dura mater adheres: on its external ſurface are ſituated the frontal and temporal muſcles, and the cartilaginous annule of the muſculous trochlearis of the eye. See TROCHLEARES, *&c.*

FRONTIGNIAC, a town of Languedoc, in France, ſituated ſixteen miles ſouth-weſt of Montpelier, and remarkable for producing excellent wine.

FRONTIGNIAC is alſo the name of a fort, ſituated on the river St. Laurence, in North America: weſt longitude 77° and north latitude 43° 20′.

FRONTISPIECE, in architecture, the portrait or principal face of a building. See the article BUILDING.

FRONTISPIECE is alſo uſed to ſignify an ornament fronting the title-page of a book, which, in ſome meaſure, ſhould expreſs the ſubject treated of.

FRONTLET, or FRONTAL. See the article FRONTAL.

FRONTON, in architecture, the ſame with pediment. See PEDIMENT.

FROST, in phyſiology, ſuch an exceſſively cold ſtate of the air, as converts watery fluids into ice. See FREEZING and ICE. In very cold ſnowy weather, not only water, but urine, beer, ale, milk, vinegar, and even wine, are either wholly or in part, converted into ice, though the laſt but ſlowly. As to the freezing of expreſſed oils, a very intenſe cold may deprive them of their fluidity, ſo as to be capable of being cut into portions of any figure; but whether they are convertible into real ice, is not yet determined. In Ruſſia oil freezes much harder than with us, but does not even there become perfect ice. Common aniſe-ſeed water, and the like weak ſpirits, are ſaid to be converted into an imperfect ice in Muſcovy; and the ſtrong ſpirits into a ſubſtance like that of oil. When brandy freezes, a liquid part, much ſtronger than common brandy, retires to the center of the veſſel.

Even ſolid bodies are liable to be affected by froſt: timber is often apparently frozen, and rendered exceedingly difficult to ſaw. Marle, chalk, and other leſs ſolid terreſtrial concretions, will be ſhattered by ſtrong and durable froſts. Metals are contracted by froſt: thus, an iron-tube twelve feet long, upon being expoſed to the air in a froſty night, loſt two lines of its length. On the contrary, it ſwells or dilates fluids near one tenth of their bulk. Mr. Boyle made ſeveral experiments with metalline veſſels, exceeding thick and ſtrong; which being filled with water, cloſe ſtopped, and expoſed to the cold, burſt by the expanſion of the frozen fluid within them. Trees are frequently burnt up with froſt, as with the moſt exceſſive heat; and in very ſtrong froſts, walnut-trees, aſhes, and even oaks, are ſometimes miſerably ſplit and cleft, ſo as to be ſeen through, and this with a terrible noiſe like the exploſion of fire-arms.

Froſt naturally proceeds from the upper parts of bodies downwards; but how deep it will reach in earth or water, is not eaſily known, becauſe this depth may vary with the degree of coldneſs in the air, by a longer or ſhorter duration of the froſt, the texture of the earth, the nature of the juices wherewith it is impregnated, the conſtitution of its more internal parts, as to heat and cold, the nature of its effluvia, *&c.* Mr. Boyle, in order to aſcertain this depth, after four nights of hard froſt, dug in an orchard, where the ground was level and bare, and found the froſt had ſcarce reached 3½ inches; and in a garden nearer the houſe, only 2 inches below the ſurface. Nine or ten ſucceſſive froſty nights froze the bare ground in the garden 6½ inches deep; and in the orchard, where a wall ſheltered it from the ſouth ſun, to the depth of 8½ inches. He alſo dug in an orchard, near a wall, about a week afterwards, and found the froſt to have penetrated to the depth of 14 inches. In a garden at Moſcow, the froſt in a hard ſeaſon, only penetrates to 2 feet: and the utmoſt effect that Capt. James mentions the cold to have had upon the ground of Charleton-iſland, was to freeze it to 10 feet deep: whence may appear the different degrees of cold of that iſland and Ruſſia. And as to the freezing of water at the above-mentioned iſland, the captain tells us, it does not naturally congeal above the depth of 6 feet, the reſt being by accident. Water alſo, expoſed to the cold air in large veſſels, always freezes firſt at the upper ſurface, the ice gradually increaſing and thickening downwards; for which reaſon frogs retire in froſty weather to the bottom of ditches: and it is ſaid, that ſhoals of fiſh retire in winter to thoſe depths of the ſea and rivers; where they are not to be found in ſummer. Water, like the earth, ſeems not diſpoſed to receive any very intenſe degree of cold at a conſiderable depth or diſtance from the air; the vaſt maſſes of ice found in the northern ſeas being only many flakes and fragments, which ſliding under each other, are, by the congelation of the intercepted water, cemented together.

In cold countries, the froſt proves often fatal to mankind; not only producing cancers, but even death itſelf. Thoſe who die of it have their hands and feet firſt ſeized, till they grow paſt feeling it; after which the reſt of their bodies is ſo invaded, that they are taken with a drowſineſs, which if indulged, they awake no more, but die inſenſibly. But there is another way whereby it proves mortal, *viz.* by freezing the abdomen and viſcera, which on diſſection are found to be mortified and black. See the article COLD.

Sharp froſts of long continuance, are very prejudicial to fiſh in ſhallow ſtanding waters; but if the water be deep, or there be either a current or freſh ſpring in the place, the fiſh generally eſcape. Ponds, therefore, ſhould be made large and deep, at leaſt one part of them ought to be conſiderably deep, to ſerve as a place of refuge in caſe of extreme cold. The ſymptom of mortality in a pond, is the appearance of the fiſh; for nothing but the pangs of death can make them move from the bottom in froſty weather. The only effectual method to ſave fiſh in this caſe, is to ſet great tubs or fats full of water in ſome out houſe, not far from the fire; then making holes in the ice, the fiſh will gather about them, as if they came up for freſh air; and are to be taken out and put into the tubs, where they may be kept till the froſt breaks, taking care to freſhen the water every twelve hours. Sometimes fiſh that have been dead to all appearance, and others frozen and enveloped in ice, have been preſerved by puting them into water brought to midſummer heat; for in ſix or ſeven hours the ice will be diſſolved, and the fiſh appear as briſk and well as ever; after which they are to be put into waters, where the froſt cannot injure them.

Hoar-FROST, *pruina,* a cold moiſt vapour, that is drawn up a little way into the air, and in the night falls again on the earth, where it is congealed into icy cryſtals of various figures. Hoar-froſt, therefore, is nothing but dew, turned into ice by the coldneſs of the air. See DEW.

FROTH, a white, light ſubſtance, formed on the ſurface of fluids, by vehement agitation, conſiſting of little ſpherules, or globules.

FROTH-SPIT, or CUCKOW-SPIT, a name given to a white froth, or ſpume, very common in the ſpring, and firſt months of the ſummer, on the leaves of certain plants, particularly on thoſe of the common white field lychnis, or catch-fly, thence called by ſome ſpatling poppy.

All writers on vegetables have taken notice of this froth, though few have underſtood the cauſe or origin of it till of late; being formed by a little leaping animal, called by ſome the flea graſshopper; by applying its anus cloſe to the leaf, and diſcharging thereon a ſmall drop of a white viſcous fluid, which containing ſome air in it, is ſoon elevated into a ſmall bubble: before this is well formed, it depoſites ſuch another drop, and ſo on, till it is every way overwhemed with a quantity of theſe bubbles, which form the white froth which we ſee.

FROTH, or **FOAM**, in the manege, a moiſt, white matter, that ariſes from the mouth of a horſe. A horſe that, by champing on his bridle, throws out a great deal of froth, is judged to be a horſe of mettle and health, and to have a cold freſh mouth.

FROWER, an edged tool uſed in cleaving wood into laths.

FROZEN. See the articles FROST, FRIEZING, ICE, &c.

FROZEN or **FRIGID-ZONE**. See the article ZONE.

FRUCTIFEROUS, ſignifies properly any thing that produces fruit; but, in a more large and figurative ſenſe, it is uſed by ſome, particularly lord Bacon, for ſuch experiments in natural philoſophy, as prove advantageous to the experimenter in point of gain or profit.

FRUCTIFICATION, among botaniſts, in a more lax ſenſe, includes the flower and fruit, with their ſeveral coverings. See the articles FLOWER and FRUIT.

Strictly ſpeaking, however, the term fructification ſignifies only the male and female organs of generation, called the ſtamina and piſtil. See STAMINA, PISTIL, and GENERATION.

FRUCTISTS, *fructiſtæ*, in botany, that ſort of authors who have attempted the eſtabliſhing the claſſes and diſtinctions of plants upon the fruit, ſeed, or receptacle of theſe in plants. Of this liſt are Cæſalpinus, Moriſon, Ray, Herman, and Boerhaave.

FRUGIVOROUS BIRDS, are ſuch as feed on fruits, either wholly or in part.

The frugivorous birds, according to Mr. Willoughby, are a ſpecies of terreſtrial birds, ſome of which have crooked bills and claws, yet are of gentler nature, and not rapacious.

FRUIT, in general, includes whatever the earth produces for the nouriſhment and ſupport of man, and other animals, as herbs, grain, hay, corn, &c. See the articles HERB, GRAIN, &c.

FRUIT, more properly, ſignifies the production of a tree, or plant, for the propagation or multiplication of its kind, in which ſenſe the word takes in all kinds of ſeeds, with their furniture. But botaniſts, uſually underſtand by it that part of a plant wherein the ſeeds are contained. See PLANT and SEED.

FRUIT alſo implies an aſſemblage of ſeeds in a head; as in a ranunculus, &c. and all kinds of ſeeds, or grains, whether incloſed in a cover, capſule, or pod; and whether bony, fleſhy, ſkinny, membranous, or the like.

The fruit in all plants, is the product, or reſult, of the flower; or that for the production and nutrition of which the flower was intended.

The ſtructure and parts of different fruit differ in ſome things, but in all the ſpecies, the eſſential parts of the fruit appear to be only continuations or expanſions of thoſe which are ſeen in the other parts of the tree; and the ſame fibres are continued to them from the root. An apple, cut in two tranſverſely, will be found principally compoſed of four parts. 1. A ſkin, or rind, which is only a continuation and expanſion of the outer bark of the tree. 2. A parenchyma, or pulp, which is an expanſion and intumeſcence of the blea, or inner bark of the tree. 3. The fibres, or ramifications of the woody part of the tree. 4. The core, which is the produce of the pith of the wood, indurated, or ſtrengthened by twigs of the woody fibres intermixed with it. This ſerves to furniſh a proper lodging for the ſeeds, and filtrates the juices of the parenchyma, or pulp, and conveys them to the ſeeds.

Of the fibres there are generally reckoned fifteen branches, of which, ten penetrate the parenchyma, and incline to the baſis of the flower; the other five aſcend more particularly from the pedicle, or ſtalk, and meet with the former at the baſe of the flower; and to theſe branches the capſulæ, or coats of the kernel, are faſtened. Theſe branches, being firſt extended through the parenchyma to the flower, furniſh the neceſſary matter for the vegetation of it, but as the fruit increaſes, it intercepts the aliment, and by this means the flower is ſtarved, and falls off.

In a pear, there are five parts to be diſtinguiſhed; the ſkin, parenchyma, ramification, ſtone and acetarium; the firſt three parts are common to the apple: the ſtone, obſerved chiefly in choak-pears, is a congeries of ſtony corpuſcles, which are diſperſed throughout the whole parenchyma, but in the greateſt plenty, and amaſſed cloſeſt together, about the center of the acetarium. This ſeems formed of the ſtony or calculous part of the nutricious juice.

The acetarium is a ſubſtance of a tart, acid taſte, and of a globular figure, incloſed in an aſſemblage of ſeveral of the ſtony parts before-mentioned.

In plums, cherries, *&c.* there are four parts, *viz.* a coat, parenchyma, ramification, and ſtone. The outer part, or ſhell of the ſtone, ſeems formed of the calculous part of the nutricious juice of the plant; and the inner part, or kernel, of the pith of the tree, derived thither by ſeminal branches, which penetrate the baſe of the ſtone. The acorn conſiſts of a ſhell, cortex, and medulla; the ſhell conſiſts of a coat and parenchyma, derived from the bark and wood of the tree. The cortex conſiſts of an inner and outer part, the firſt of which is a duplicature of the inner trunk of the ſhell; the ſecond is a ſofter ſubſtance, derived from the ſame ſource as the parenchyma of the ſhell. But authors are not agreed whether the medulla, or pulp of the kernel, doth ariſe from the pith of the tree, or from the cortical part thereof.

Berries, grapes, *&c.* contain, beſides three general parts, *viz.* coat, parenchyma, and ramification, grains of a ſtony nature, which are the ſeeds.

Uſe of **FRUITS.** Fruits are ſerviceable in guarding, preſerving, and feeding the incloſed ſeed; in filtrating the coarſer, more earthy and ſtrong parts of the nutritious juice of the plant, and retaining it to themſelves, ſending none but the moſt pure, elaborated and ſpirituous parts to the ſeed, for the ſupport and growth of the tender delicate embryo, or plantule, therein contained.

The uſe of fruits, with us, might be rendered much more extenſive than it is. Many fruits, which do hurt when eaten raw, would make wines equal in flavour to many of thoſe now obtained at great prices from abroad; and lands which will not bear corn, yet would bear trees and ſhrubs, producing ſuch fruits.

Cherries, properly managed, make an excellent wine, and that in very large quantities, and plums alſo make a very agreeable kind; but that it has an auſtereneſs, which muſt be taken off by mixing a little ſugar with it, when in the glaſs, not before it is drawn off. A coarſe plum, a little larger than a damſon, is the beſt kind for this wine, being a ſort of plum that grows wild in our hedges. The wine made from it is of a very conſiderable ſtrength, and affords a pleaſant brandy, by diſtillation, in conſiderable quantities. Our common garden currants afford a very agreeable wine; and our gooſeberries are not ſecond to any thing. See BRANDY, WINE, *&c.*

The various uſes of different fruits in the materia medica, *&c.* may be ſeen in the courſe of this work, each under its proper head.

Preſervation of **FRUIT.** In the Philoſophical Tranſactions, n° 237, we have a receipt for preſerving fruit and flowers for a whole year, which is as follows. Take ſalt petre, one pound; bole armoniac, two pounds; common clean ſand three pounds: mix them together; and, in dry weather, take fruit or flowers of any ſort, not fully ripe, each with its ſtalk, and put them ſingly into an open glaſs, till it be full; cover it cloſe with oil cloth; and in a dry cellar, put each of theſe glaſſes four fingers-deep under ground, ſo that quite round above, as well as below, there may remain two fingers thick of the mixture.

To preſerve quinces, apples, *&c.* lord Bacon directs us to plunge them in honey; but as that may give them an over luſcious taſte, to dip them in ſyrup of wine, boiled to a due height. The conſervation of fruit, continues that author, ſhould be tried in veſſels filled with fine ſand, or powder of chalk; or in flour, the duſt of oakwood, *&c.* Fruits intended for long keeping, he ſays, ſhould be gathered before they are full ripe, and in a fair day, towards noon, the wind not blowing ſouth, and the moon being under the horizon, and in her decreaſe.

Firſt **FRUITS.** See FIRST FRUITS.

FRUIT-TREES. With regard to fruit-trees it may be obſerved, 1. That the cutting and pruning them, when young, prevent their bearing, though it contributes to the richneſs and flavour of the fruit, as well as to the beauty of the tree. 2. That kernel fruit-trees come later to bear than ſtone fruit-trees; the time required by the firſt before they come to any fit age for bearing, being one with another five years; but when they do begin, they bear in greater plenty than ſtone-fruit. 3. That ſtone fruit, figs, and grapes, commonly bear conſiderably in three or four years; and bear full crops the fifth and ſixth years; and hold it for many years, if well ordered. 4. That fruit-trees in the ſame neighbourhood will ripen a fortnight ſooner in ſome grounds than in others of a different temperature. 5. That in the ſame country hot or cold ſummers ſet conſiderably forwards, or put backwards the ſame fruit. 6. That the fruit on wall-trees generally ripen before thoſe on ſtandards, and thoſe on ſtandards before thoſe on dwarfs. 7. That the fruit of all wall-trees planted in the ſouth and eaſt quarters, commonly ripen about the ſame time, only thoſe in the ſouth rather earlier than thoſe in the eaſt; thoſe in the weſt are later by eight or ten days, and thoſe in the north, by fifteen or twenty. For the planting, pruning, grafting, &c. of fruit-trees, ſee the articles PLANTING, TRANSPLANTING, PRUNING, GRAFTING, ORCHARD, GARDEN, NURSERY, &c.

FRUITERY, a place for the keeping of fruit, a fruit-houſe, or fruit-loft.

A fruitery ſhould be inacceſſible to any thing of moiſture, and ſhould be as much as poſſible ſo, even to froſt.

FRUITFULNESS, the quality of bearing plenty of fruit. See FRUIT.

FRUMENTACEOUS, a term applied, by botaniſts, to all ſuch plants as have a conformity with wheat, in reſpect of their fruits, leaves, ears, or the like.

FRUMENTARII, a kind of ſoldiers, or archers, under the weſtern empire.

The firſt time we read of theſe officers is in the time of the emperor Adrian, who made uſe of them to inform himſelf of whatever paſſed. They did not make any particular corps diſtinct from the reſt of the forces, but there was a certain number of them in each legion. It is ſuppoſed that they were at firſt a number of young perſons diſpoſed, by Auguſtus, throughout the provinces, particularly on all the grand roads, to acquaint the emperor, with all expedition, of every thing that happened.

Afterwards they were incorporated into the troops themſelves, where they ſtill retained their antient name.

Their name of frumentarii is derived from their being alſo a ſort of purveyors to the armies, cities, &c. collecting all the corn from the ſeveral provinces to furniſh the common-wealth.

FRUMENTATION, in roman antiquity, a largeſs of corn beſtowed on the people. This practice of giving corn to the people was very antient among the Romans; and frequently uſed to ſooth the turbulent humour of the populace. At firſt the number of thoſe to whom this largeſs was given, was indeterminate, till Auguſtus fixed it at two hundred thouſand.

FRUMENTY, or FURMETY, a kind of pottage, made up of wheat, milk, ſugar, ſpice, &c.

FRUMGYLD, in old law books, ſignifies the firſt payment made to the kindred of a perſon ſlain, by way of recompence for his murder.

FRUMSTOL, a term antiently uſed for a manſion-houſe.

FRUSH, or FROG, among farriers, a ſort of tender horn which ariſes in the middle of a horſe's ſole; and, at ſome diſtance from the toe, divides into two branches, running towards the heel in the form of a fork.

The fruſh is a part of a horſe's foot, the top of which only ſhould be pared, and that every time the foot is pared, otherwiſe it is apt to corrupt.

FRUSTUM, in mathematics, a part of ſome ſolid body ſeparated from the reſt.

The fruſtum of a cone is the part that remains, when the top is cut off by a plane parallel to the baſe; and is otherwiſe called a truncated cone; for finding the ſurface and ſolidity of which, ſee the article CONE.

The fruſtum of a pyramid is alſo what remains after the top is cut off by a plane parallel to its baſe, the menſuration of which will be found under the article PYRAMID.

The fruſtum of a globe or ſphere is any part thereof cut off by a plane, the ſolid contents of which may be found by this rule. To three times the ſquare of the ſemidiameter of the baſe, add the ſquare of its height; then multiplying that ſum by the height, and this product multiplied by .5236 gives the ſolidity of the fruſtum. See the article SPHERE.

A fruſtum or portion of any ſolid, generated by the revolution of any conic ſection upon its axis, and terminated by any two parallel planes, may be thus compared to a cylinder of the ſame altitude, and whoſe baſe is equal to the middle ſection of the fruſtum made by a pa-a parallel plane. 1. The difference between ſuch fruſtum and cylinder is always the ſame in different parts of the ſame or of ſimilar ſolids; when the inclination of the planes to the axis, and the altitude of the fruſtum are given. 2. In the parabolic conoid, this difference vaniſhes; the fruſtum being always equal to a cylinder of the ſame height, upon the ſection of the conoid that biſſects the altitude of the fruſtum, and is parallel to its baſes. 3. In the ſphere, the fruſtum is always leſs than the cylinder, by one fourth part of a right-angled cone of the ſame height with the fruſtum; or, by one half of a ſphere, of a diameter equal to that height: and this difference is always the ſame in all ſpheres whatever, when the altitude of the fruſtum is given. 4. In the cone, the fruſtum always exceeds the cylinder, by one fourth part of the content of a ſimilar cone, that has the ſame height with the fruſtum. See Mac Laurin's Fluxions, p. 24. where he likewiſe compares the fruſtums of the hyperbolic conoid and ſpheroid with a cylinder. See alſo GAUGING.

FRUTEX, among botaniſts, denotes a ſhrub. See the article SHRUB.

FRUTEX ÆTHIOPICUS and AFRICANUS, a name given to ſeveral ſpecies of pine. See the article PINE.

FRUTICOSE STALKS, among botaniſts, thoſe with a hard woody ſubſtance. See the article STALK.

FRY, in zoology, ſignifies the ſpawn, or rather young, of fiſh. See FISH.

FRYTH, or FRITH, in old law books. See the article FRITH.

FUAGE, in old writers, a tax of 12 d. for every fire, levied in the time of Edw. III.

FUCHSIA, in botany, a genus of plants, the characters of which are not perfectly aſcertained. The flower conſiſts of a ſingle petal, the tube is elevated; the limb is divided into eight ſegments, and plane; the ſegments are acuminated, and alternately lower; the fruit is a roundiſh berry, marked with four furrows, and containing four cells: the ſeeds are numerous, oval, and placed in a double ſeries.

FUCUS, in botany, a genus of ſubmarine plants, belonging to the cryptogamia claſs of Linnæus.

The fucus conſiſts of a tough matter, formed into a kind of leaves, which are flat and variouſly divaricated; and which have ſome appearance of fructification in punctated tubercles, covering oblong veſicles, ſuppoſed by Linnæus to be male flowers; and ſmooth, roundiſh veſicles, hollow and interwoven with filaments, which appear to him to be female flowers. There are a great many ſpecies of fucus with broader or narrower leaves, and other peculiarities; one of which, the broad-leaved, ſerrated fucus, grows to the height of ſix, eight, or more inches.

FUCUS is alſo uſed for a paint, or compoſition applied on the face to beautify it, and heighten the complexion.

The fucus of the Roman dames was a kind of white earth or chalk, brought from Chio and Samos, diſſolved in water. The fucus ſolimanni is a compoſition of prepared ſublimate, in great repute among the Spaniards of Peru.

FUEL, whatever is proper to burn or make a fire; as, 1. Wood, which ſhould be ſo felled that cattle may have the browſing of it; for in winter they will not only eat the tender twigs, but even the very moſs. The underwood is uſually felled for fuel; but if the head or top be uſed for firing, it is beſt to begin three or four feet above the timber, if conſiderable. 2. Foſſil and bituminous earths, as turfs and peats. 3. Sulphureous foſſils of a firmer texture, as the common coals, ſcotch coals, cannel-coal, *&c.*

It is provided by ſtatute, that wood-fuel ſhall not be felled under the aſſize, *viz.* a faggot bound is to be three feet in length, and have the bond twenty-four inches round, beſides the knot. Billets alſo are to be of a certain length, on certain penalties. See the article BILLET.

The fuel, in chemical operations, muſt be choſen ſuitable to the intention. The natural ſun, in ſummer, ſuffices for inſolations. A ſpirit-lamp may be made to give a moderate, or a conſiderably ſtrong heat, according to the number of wicks employed. The lighter fuels, ſuch as ſtraw, leaves, twigs, *&c.* come next in order, after ſpirit of wine; then oils, wax, roſin, pitch, and, laſtly, ſolid wood, coals, and turf: all which may have their proper furnaces, ſo as to be burnt in the requiſite quantity, and with requiſite fierceneſs or ſlowneſs. To excite the greateſt degree of heat, the rule is to uſe the denſeſt fuel in large quantities, which muſt be blown inceſſantly with bellows all round the fire wherein the matter to be acted on is lodged.

FUENTE DUENA, a town of New-Caſtile, in Spain, 35 miles ſouth-eaſt of Madrid.

FUGA VACUI in the antient ſchools of philoſophy, a ſuppoſed averſion in nature to a vacuum. See VACUUM.

FUGALIA, in roman antiquity, a feaſt ſuppoſed by ſome to be the ſame with the regifugium, held on the 24th of February, in memory of the expulſion of the kings, and the aboliſhing of the monarchical government. Others again, diſtinguiſh the fugalia from the regifuge. And others think, that the fugalia was the ſame with the poplifugia; or the feaſt of fugia, the goddeſs of joy, occaſioned by the rout of an enemy, which was the reaſon the people abandoned themſelves to riot and debauchery.

FUGAM FECIT, in law, is when it is found by inquiſition that a perſon fled for felony, &c.

If flight and felony be found on an indictment for felony, or before the coroner, where the murder is committed, the offender ſhall forfeit all his goods, and the iſſues of his lands, till he is acquitted or pardoned: and upon finding before juſtices of oyer, &c. that the offender fled, though he be acquitted on his trial, he forfeits his goods.

FUGITIVE, a perſon obliged to fly his country, or remove from a place where he had ſome abode, or eſtabliſhment, on account of his crimes, debts, or other occaſions.

FUGITIVE'S GOODS, the proper goods of the perſon that flies on a felony committed by him, which, after the flight, is lawfully found to belong to the king, or lord of the manor.

FUGITIVES OVER SEA, perſons that go over ſea without the king's licenſe, who, unleſs they are merchants, or eminent perſons, forfeit all their goods.

FUGUE, in muſic, is when different parts of a muſical compoſition follow each other; each repeating what the firſt had performed.

There are three kinds of fugues; the ſimple, double, and counter.

Single, or *Simple* FUGUE, is ſome point conſiſting of four, five, or more notes, begun by one ſimple part, and ſeconded by a ſecond, third, fourth, fifth, &c. if the compoſition conſiſt of ſo many; repeating the ſame, or ſuch like, notes; (*i. e.* in the ſame proportion) ſo that the ſeveral parts follow, or come in one after another, in the ſame manner; the leading part ſtill flying before thoſe that follow.

FUGUE DOUBLE, or FUGA DOPPIA, is when two or more different points move together in a fugue, and are alternately mixed and interchanged by the ſeveral parts. See the article PART.

Counter FUGUE. See COUNTER.

FULCRUM, in mechanics, the prop or ſupport, by which a lever is ſuſtained. See the article LEVER.

FULD, a town and abbey of Germany, the abbot of which is a prince of the empire: eaſt long. 9° 35′, north lat. 50° 24′.

FULICA, the COOT, in ornithology, a genus of birds, of the order of the gallinæ, with a naked or bald forehead, and divided or cloven feet: add to this, that all the toes are longer than in whole-footed birds, and have ſemi-circular membranes affixed to their joints.

Of this bird, authors mention ſeveral ſpecies, all diſtinguiſhed by their cloven toes, and a fleſhy excreſcence bare of feathers, and reaching from the bill almoſt to the crown of the head.

FULIGINOUS, whatever proceeds from a thick, ſooty ſmoke, ſuch as litharge and lamp-black.

FULIGNO, a city of Italy, in the pope's territories, ten miles north of Spoletto.

FULIGO, in natural hiſtory, a ſpecies of pumice-ſtone. See PUMICE.

FULIGULA, in ornithology, the name by which authors call the tufted duck, with a hanging creſt, a black body, and white belly, and a white ſpot on the wings. It is about the ſize of the common duck.

FULL-MOON, *plenilunium*, that phaſis of the moon when, in her oppoſition to the ſun, the whole of her diſc is illuminated; in which time eclipſes of the moon can only happen. See the articles MOON and ECLIPSE.

FULLER, a workman employed in the woolen manufactories, to mill, or ſcour, cloths, ſerges, and other ſtuffs, in order to render them more thick, compact, and durable. See the article CLOTH.

Fullers, in conformity to the regulations of the manufacturers in France, are obliged to mark their ſtuffs with a particular lead after fulling. They are forbid, by the ſame regulations, to draw out, or tenter-ſtretch, their manufactures, that they may be made greater in length, and narrower in breadth, &c.

FULLER'S EARTH, *terra fullonica*, in natural hiſtory, a ſoft, greyiſh, brown, denſe, and heavy marle: when dry, it is of a greyiſh, aſh-coloured brown, in all degrees from very pale to almoſt black, and it has generally ſomething of a greeniſh caſt: it is very hard and firm, of a compact texture, of a rough and ſomewhat duſty ſurface, that adheres ſlightly to the tongue: it is very ſoft to the touch, not ſtaining the hands, nor breaking eaſily between the fingers: it has a little harſhneſs between the teeth, and melts freely in the mouth: thrown into water, it makes no ebullition, or hiſſing, but ſwells gradually in bulk, and falls into a fine ſoft powder. It makes no efferveſcence with aqua fortis.

It is of great uſe in ſcouring cloths, ſtuffs, *&c.* imbibing all the greaſe and oil uſed in preparing, dreſſing, *&c.* of the wool, for which reaſon it is made a contraband commodity, and is not to be exported under the penalty of 1 s. for every pound weight. See FULLING.

FULLER'S WEED, in botany, a name ſometimes given to the dipſacus, or teaſel. See the article DIPSACUS.

FULLERY, a place where cloths, *&c.* are fulled. See the next article.

FULLING, the art or act of ſcouring and preſſing cloths, ſtuffs, ſtockings, *&c.* to cleanſe, thicken, and render them more firm and ſtrong, which is done by means of a water-mill.

For the deſcription of this mill, ſee plate CVIII. fig. 1. in which, 1. is the track of the wheel, that turns on the outſide; 2. a front view of the wheel; 3. the arbour with its leavers, which, as they paſs, raiſe the heads of the wooden mallets, and let them fall alternately; 4. the trough, which in the plate is hid behind the timber work, and is only expreſſed by dots that ſhew its poſition: each trough has at leaſt two, and ſometimes three mallets; 5. the head of the mallet, with three or four notches, which hinder the ſtuff from ſticking under the hammer; 6. the arm or handle; 7. the end of the mallet faſtened by a pin. 8. In the troughs are laid the cloths, ſtuffs, *&c.* intended to be fulled: then letting the current of water fall on the wheel, the mallets are ſucceſſively let fall upon them, when by their weight and velocity they ſtamp and preſs the ſtuffs very ſtrongly, which by this means become thickened and condenſed.

In this operation, fuller's earth is uſed with ſome proportion of ſoap; but ſoap alone would do much better, was it not dearer than fuller's earth.

Fulling of ſtockings, caps, *&c.* is performed either with the hands or feet, or a kind of wooden machine, either armed with wooden teeth, or thoſe of horſes or bullocks. The ingredients generally uſed on this occaſion are fuller's earth, urine, white ſoap and green ſoap. But water ſoftened with chalk is far preferable.

The following is M. Colmet's method of fulling with ſoap, grounded on experiments made by order of the marquis de Louvois. Let a coloured cloth of about forty-five ells be laid in the uſual manner in the trough of a fulling-mill, without firſt ſoaking it in water, as commonly practiſed in moſt places. To full this troughful of cloth, fifteen pounds of ſoap are required, one half of which is to be melted in two pails of river or ſpring water, made as hot as the hand can bear. Let this ſolution be poured by little and little, upon the cloth, in proportion as it is laid in the trough; thus it is to be fulled for at leaſt two hours; after which, let it be taken out and ſtretched. This done, let the cloth be immediately returned into the ſame trough, without freſh ſoap, and there fulled two hours more. Then take it out, wring it well, and expreſs all the greaſe and filth. After the ſecond fulling, diſſolve the remainder of the ſoap, as the former part, and throw it at four ſeveral times on the cloth, not forgetting to take it out every two hours, to undo the plaits and wrinkles it got in the trough. When it is ſufficiently fulled, and brought to the requiſite quality and thickneſs, it is ſcoured out for good in hot water, keeping it in the trough till it be thoroughly clean. As white cloths full more eaſily than coloured ones, a third part of the ſoap may be ſpared.

FULLO, in ichthyology, a name uſed by ſeveral authors for the tench.

FULMINATING, ſomething that thunders, or reſembles thunder. See the article THUNDER.

Naturaliſts ſpeak of fulminating gold, fulminating powder, *&c.* See the articles AURUM, PULVIS, *&c.*

FULMINATING LEGION, in antiquity. See the article THUNDERING LEGION.

FULMINATION, in chemiſtry, is uſed in a ſynomous ſenſe with detonation. See the article DETONATION.

Fulmination in the depuration of the more perfect metals, is, when upon infuſing

fuſing them with lead, a brighter colour ſucceeds a kind of ſulphureous cloud, before appearing in the metals, during the fuſion.

Fulmination, in the romiſh canon-law, a ſentence of a biſhop, official, or other eccleſiaſtic appointed by the pope, by which it is decreed, that ſome bull ſent from the pope ſhall be executed.

Fulmination is alſo uſed for the denunciation, or execution of a ſentence of anathema, made public with due ſolemnity. See Anathema.

FUMARIA, in botany, a genus of the diadelphia hexandria claſs of plants, with a polypetalous anomalous flower, the petals of which are oblong and tubulated: the fruit is a ſmall unilocular pod, containing a number of roundiſh ſeeds.

This genus comprehends the fumitory, baſtard-fumitory, capnoides, cyſticapnos, cucularia, corydalis, and capnorchis of authors; ſome with a roundiſh, others with an ovato-acuminated, and others with a very long pod.

The whole plant of fumitory is uſed in medicine, being accounted good in the ſcurvy, jaundice, and diſorders of the meſentery and ſpleen.

FUME, in medicine. See Fumigation.

FUMET, a term uſed by ſportſmen for the ordure, or dung, of harts.

FUMIGATION, in chemiſtry, a kind of calcination, when metals, or other hard bodies, are corroded, or ſoftened, by receiving certain fumes for that purpoſe.

Fumigation, in medicine, the application of fumes to particular parts of the body; as thoſe of factitious cinnabar, to venereal ulcers. See the article Ulcer.

An hyſteric fume is made of an ounce of aſſa fœtida, and a pound of the beſt white-wine vinegar, boiled in a pot with a narrow mouth, to which the patient ſhould hold her head, with her mouth open. Steams received this way up the noſe, have very ſudden and remarkable effects, but this application ſeems juſtifiable only in caſes where other means cannot be uſed. See Hysteric.

A fumigation for a catarrh is made by taking olibanum, amber, benjamin, gum guaiacum, and balſam of Tolu, of each two ſcruples: and making them all into a groſs powder to burn.

Where the defluxion is very thin, and has much of its cauſe in the laxity of the glands, ſuch means may do ſervice, by conſtringing the parts, and repelling the flux; but where there is an aſthma, and very weak lungs, it may be very inconvenient. See the article Catarrh.

To make a fumigation againſt the falling down of the anus, or fundament. Take frankincenſe, maſtic, amber, and cloves, of each a dram; red roſe leaves, balauſtines, of each two drams; make them into a groſs powder.

This is to be burnt upon a chaffing-diſh of coals, under a chair, with a hole in it; over which the patient is to ſit with the bare part to it, after the gut is thruſt up; and by ſuch means continued, will the ſphincter at laſt get ſtrength enough to keep it up, without any ſuch help. In a teneſmus it is alſo of uſe. See the article Prolapsus.

A fumigation againſt the falling down of the womb is made by taking myrrh, maſtic, cinnamon, and ſpikenard, of each a dram; mint and red roſes of each two drams; cloves, zedoary, and pimento of each half a dram. Make all into a powder to burn.

This is to be uſed as the preceding; and in the ſame weakneſs it is alſo good, as that is of ſervice in this.

Fumes from hot aromatic liquors, which are ſometimes directed to the ſame purpoſes, are hardly ſo efficacious as thoſe which ariſe from the burning of dry ingredients, becauſe their moiſture prevents their being ſo immediately reſtringent.

FUMITORY, *fumaria*, in botany. See Fumaria.

FUNAMBULI, in antiquity, rope dancers. See the article Dance.

FUNCHAL, the capital of the Madeira-iſlands, ſubject to Portugal: weſt long. 16°, north lat. 32° 33′.

FUNCTION, the act of fulfilling the duties of any employment.

Function, being alſo applied to the actions of the body, is by phyſicians divided into vital, animal, and natural. The vital functions are thoſe neceſſary to life, and without which the individual cannot ſubſiſt; as the motion of the heart, lungs, &c. The natural functions are ſuch as it cannot ſubſiſt any conſiderable time without them, as the digeſtion of the aliment, and its converſion into blood. Under animal functions are included the ſenſes of touching, taſting, &c. memory, judgment, and voluntary motion, without any or all of which an animal may live, but not very comfortably.

The animal functions perform the motion of the body by the action of the muſcles, and this action conſiſts chiefly in the ſhortening the fleſhy fibres, which is called contraction, the principal agents of which, are the arteries and nerves diſtributed in the fleſhy fibres. See the articles ARTERY and NERVE.

In ſhort, all parts of the body have their own functions, or actions peculiar to themſelves. Life conſiſts in the exerciſe of theſe functions, and health in the free and ready exerciſe of them.

FUNCTION, in algebra, denotes any compound quantity; and when one of the component quantities is variable, it is ſaid to be a variable function. See the article QUANTITY.

Functions are formed either by addition, ſubtraction, multiplication, diviſion, involution or evolution; as alſo by the reſolution of equations. But beſides theſe, which are called algebraical functions, there are others called tranſcendental, ariſing from the management of exponents, logarithms, *&c.*

For a farther account of functions, the reader may conſult Bernoulli, Oper. T. 3. alſo Euler's Analyſ. Infinitor.

FUND, in anatomy, ſignifies the bottom of any cavity in the body; thus, the fund of the eye is that part poſſeſſed by the choroides and retina; the fund of the uterus, the fund of the bladder, *&c.* ſignify alſo the bottom of theſe parts. See the articles EYE and UTERUS.

FUND, in commerce, ſignifies the ſtocks of the great trading and monied companies.

FUNDS is alſo a term adopted by thoſe who ſpeak of the public revenue of nations, to ſignify the ſeveral taxes that have been laid upon merchandizes either by way of duties of cuſtom, or exciſe, or in any other manner, to ſupply the exigencies of the ſtate, and to pay intereſt for what ſums it may have occaſion to borrow. Thus we ſay, ſuch a duty, or ſuch a tax, is a good fund to anſwer ſuch a purpoſe.

The funds or taxes of this kingdom, are either temporary or perpetual: temporary ones, are ſuch as are either impoſed for a certain number of years, or annually, as the land and malt-taxes: the perpetual funds, are ſuch on which money has been borrowed for the public ſervice, and which are appropriated for the ſecure and certain payment of the intereſt of ſuch money, till the diſcharge of the principal ſo borrowed. See the articles DUTY, CUSTOM, TAX, *&c.*

FUNDAMENT, in anatomy, the ſame with anus. See the article ANUS.

FUNDAMENTAL, in general, ſomething that ſerves as a baſe or foundation to another.

FUNDAMENTAL NOTE, in muſic, the principal note in a ſong, or compoſition, to which all the reſt are in ſome meaſure adapted, and by which they are ſwayed: it is otherwiſe called the key to the ſong. See the articles KEY and CLEF.

FUNDAMENTO, in the italian muſic, every part that plays or ſings the baſs; but more eſpecially the thorough baſs, as being the foundation of all harmony.

FUNDI-BAY, that ſituated between New England and New Scotland, in which there is ſaid to be an excellent fiſhery.

FUNEN, the ſecond iſland for magnitude belonging to the king of Denmark, ſituated at the entrance of the Baltic ſea, and ſeparated from Jutland by the ſtrait called the leſſer Belt, and from the iſland of Zeland by the ſtrait called the great Belt. Its chief town is Odenſee.

FUNERAL RITES, ceremonies accompanying the interment or burial of any perſon. See the article BURIAL.

Theſe rites differed among the antients according to the different genius and religion of each country. The Egyptians, among the reſt of their funeral rites, embalmed their dead. See EMBALMING.

Among the antient Greeks it was uſual ſometimes, before the interment, to put a piece of money into the mouth of the deceaſed, which was thought to be Charon's fare for wafting the departed ſoul over the infernal river. This ceremony was not uſed in thoſe countries which were ſuppoſed to be ſituated in the neighbourhood of the infernal regions, and to lead thither by a ready and direct road. The corpſe was likewiſe furniſhed with a cake, compoſed of flour, honey, *&c.* which was deſigned to appeaſe the fury of Cerberus, the door-keeper of hell, and to procure the ghoſt a ſafe and quiet entrance.

During the time the corpſe continued in the houſe, there ſtood before the door a veſſel of water, the deſign of which was, that thoſe concerned about the body, might purify themſelves by waſhing; it being the opinion of the Greeks, as well as of the Jews, that pollution was contracted by touching a dead body.

The ceremonies by which they expreſſed their ſorrow for the death of their friends, were various; but it ſeems to have been a conſtant rule to recede as much as poſſible in habit and behaviour from their ordinary cuſtoms. For this reaſon they abſtained from banquets and entertainments; they diveſted themſelves of all ornaments; they tore, cut off, or ſhaved their hair, which they caſt into the funeral pile, to be conſumed with the body of their deceaſed friend. Sometimes they threw themſelves on the ground, and rolled in the duſt, or covered their head with aſhes; they beat their breaſts, and even tore their fleſh with their nails, upon the loſs of a perſon they much lamented. When perſons of rank, ſuch as public magiſtrates, or great generals, died, the whole city put on a face of mourning: all public meetings were intermitted; the ſchools, baths, ſhops, temples, and all places of concourſe, were ſhut up. See the article MOURNING.

Interring or laying the dead in the ground, ſeems to have been the moſt antient practice among the Greeks; tho' burning came afterwards to be generally uſed among them. It was cuſtomary to throw into the funeral pile thoſe garments the deceaſed uſually wore. The pile was lighted by one of the dead perſon's neareſt relations or friends, who made prayers and vows to the winds to aſſiſt the flames, that the body might quickly be reduced to aſhes; and during the time the pile was burning, the dead perſon's friends ſtood by it, pouring libations of wine, and calling upon the deceaſed. See the article BURNING.

When Numa reformed the religion of Rome, he ordered that the pontiffs ſhould have the care of the funeral ceremonies; which, in moſt reſpects, were like thoſe of the Greeks already deſcribed.

The funeral rites among the Hebrews, were ſolemn and magnificent: when any perſon was dead, his relations and friends rent their cloaths; which cuſtom is but faintly imitated by the modern Jews, who only cut off a bit of their garment, in token of affliction. It was uſual to bend the dead perſon's thumb into the hand, and faſten it in that poſture with a ſtring; becauſe the thumb then having the figure of the name of God, they thought the devil would not dare to approach it. When they came to the burying place, they made a ſpeech to the dead in the following terms: “Bleſſed be God, who has formed thee, fed thee, maintained thee, and taken away thy life. O dead! he knows your numbers, and ſhall one day reſtore your life, *&c.*” Then they ſpoke the elogium, or funeral oration, of the deceaſed; after which they ſaid a prayer, called the righteouſneſs of judgment; then turning the face of the deceaſed towards heaven, they called out, “Go in peace.”

The ancient chriſtians teſtified their abhorrence of the pagan cuſtom of burning the dead; and always depoſited the body entire in the ground: and it was uſual to beſtow the honour of embalming upon the martyrs, at leaſt, if not upon others. They prepared the body for burial, by waſhing it with water, and dreſſing it in a funeral attire. The exportation, or carrying forth of the body, was performed by near relations, or perſons of ſuch dignity as the circumſtances of the deceaſed required. Pſalmody, or ſinging of pſalms, was the great ceremony uſed in all funeral proceſſions among the antient chriſtians.

In the romiſh church, when a perſon is dead, they waſh the body, and put a crucifix in its hand. At its feet ſtands a veſſel full of holy-water, and a ſprinkler, that they who come in may ſprinkle both themſelves and the deceaſed. In the mean time ſome prieſt ſtands by the corpſe, and prays for the deceaſed till it is laid in the earth. In the funeral proceſſion, the exorciſt walks firſt, carrying the holy water; next the croſs bearer, afterwards the reſt of the clergy, and laſt of all the officiating prieſt. They alſo ſing the *miſerere*, and ſome other pſalms; and at the end of each pſalm a *requiem*. We learn from Alet's ritual, that the faces of deceaſed laymen muſt be turned towards the altar, when they are placed in the church; and thoſe of the clergy, towards the people. The corpſe is placed in the church ſurrounded with lighted tapers: after the office for the dead, maſs is ſaid; then the officiating prieſt ſprinkles the corpſe thrice with holy water, and as often throws incenſe on it. The body being laid in the grave, the friends and relations of the deceaſed ſprinkle the grave with holy water.

The funeral ceremonies of the greek church, are much the ſame with thoſe of the latin. It needs only be obſerved, that after the funeral ſervice, they kiſs the crucifix, and ſalute the mouth and forehead of the deceaſed; after which each of the company eats a bit of bread, and drinks a glaſs of wine in the church, wiſhing the ſoul a good repoſe, and the afflicted family all conſolation.

FUNERAL COLUMN, a column crowned with an urn, wherein the aſhes of ſome deceaſed perſon are ſuppoſed to be encloſed; the fuſt or ſhaft being beſet with tears or flames, the ſymbols of grief and immortality. See COLUMN.

FUNERAL GAMES, a part of the ceremony of the antient funerals.

It was cuſtomary for perſons of quality, among the antient Greeks and Romans, to inſtitute games with all ſorts of exerciſes, to render the death of their friends more remarkable. This practice was generally received, and is frequently mentioned by antient writers. Patroclus's funeral games, take up the greateſt part of one of Homer's iliads; and Agamemnon's ghoſt is introduced by the ſame poet in Odyſſ. ω, telling the ghoſt of Achilles, that he had been a ſpectator at a great number of ſuch ſolemnities.

The celebration of theſe games among the Greeks, moſtly conſiſted of horſe-races: the prizes were of different ſorts and value, according to the quality and magnificence of the perſon that celebrated them. The garlands, given to victors on this occaſion, were uſually of parſly, which was thought to have ſome particular relation to the dead.

Thoſe games, among the Romans, conſiſted chiefly of proceſſions; and ſometimes of mortal combats of gladiators, around the funeral pile. They, as well as the Greeks, had alſo a cuſtom, tho' very antient, of cutting the throats of a number of captives before the pile, as victims to appeaſe the manes of the deceaſed. Cæſar relates, that the Gauls had this cuſtom.

The funeral games were aboliſhed by the emperor Claudius.

FUNERAL ORATION, a diſcourſe pronounced in praiſe of a perſon deceaſed, at the ceremony of his funeral.

This cuſtom is very ancient, both among the Greeks and Romans. Before the company departed from the ſepulchre, they were often entertained with a panegyrick upon the dead perſon, always pronounced by a near relation, or one of the public magiſtrates.

FUNGITÆ, in natural hiſtory, a kind of foſſile coral, of a conic figure, tho' ſometimes flatted and ſtriated longitudinally. See the article CORAL.

FUNGUS, in ſurgery, denotes any ſpongy excreſcence. See EXCRESCENCE.

In wounds made by a ſharp inſtrument, where there is no indiſpoſition of body, the cure is generally performed without any interruption, but from the fungus; and here dry lint alone is generally the beſt remedy through the whole courſe of dreſſing. See ULCER and WOUND.

If ulcers produce a ſpongy lax fleſh, ſprouting very high above the ſurface, it will be neceſſary to deſtroy it by ſome of the eſcharotics, or the knife. This fungus frequently approaches to a cancerous complexion, and when it riſes upon ſome glands, ſometimes actually degenerates into a cancer, as has happened in buboes of the groin. When excreſcences have ariſen in venereal ulcers, eſcharotics are to be preferred; and pulvis angelicus, which is a compoſition of precipitate powder and burnt alum, as it eats deeper, is preferable to precipitate alone. When the excreſcence is cancerous, and does not ariſe from a large cancer, but only from the ſkin itſelf, the actual cautery is uſually recommended; tho' it is a more ſecure method to cut away quite underneath, and afterwards to dreſs with eaſy applications; but the caſes where either of theſe methods are practicable, very rarely occur.

A fungus in the joints, is a tumour in the articulations of the limbs, without heat or pain, and ſo ſoft, that it eaſily yields to the preſſure of the finger; but upon its removal, expands itſelf immediately, without retaining any marks. This may be diſtinguiſhed from the dropſy of the joint, if it be obſerved that the latter is a diſtention of the entire joint, and the other ariſes rather on one ſide.

The moſt proper method of cure, is to rub the part affected ſeveral times a-day with warm cloths, and then to foment it with the following decoction: take of litharge, half a pound; armenian bole, an ounce; maſtich and myrrh, each half an ounce; wine vinegar, a pint: boil theſe together for a quarter of an hour. Uſe this decoction warm. See the article FOMENTATION.

If none of theſe medicines anſwer the purpoſe, an inciſion muſt be made into the tumefied joint, towards the lower and moſt commodious part, preſſing the tumour hard with your fingers, and retaining it with a bandage placed above it, to prevent its giving way. When the member is reſtored to its priſtine form, it may be healed by vulnerary balſams; but to prevent the ſerum from collecting again, purging and ſudorific medicines ſhould be given, and the wound be kept open with tents for ſome time. See WOUND.

FUNGUS, in botany, an order of vegetables, extremely different from all others, and belonging to the *cryptogamia* claſs of Linnæus.

The fungi have, indeed, ſo little of the common and general appearance of vegetables, that many have denied them to be ſuch, and contended for their being only excrementitious matter, protruded from decaying vegetables of other kinds. But notwithſtanding the fungi have neither the colour or texture of other plants, nor leaves nor flowers like them; yet they muſt be allowed to belong to the vegetable kingdom, as having abſolute and perfect ſeeds, conſiſting uſually of ſingle antheræ, which produce plants like thoſe from which they are collected.

The fungi are extremely different in figure, and in their manner and place of growth; ſome growing on the ground, ſome on living trees, and many on decayed wood; and that horizontally or erect. Some are of only a few days duration, others remain for years, and ſome there are which grow under the ſurface of the earth in no particular direction.

To the order of fungi belong a great many genera, as agaric, boletus, phallus, lycoperdon, &c. See AGARIC, &c.

FUNICULUS UMBILICALIS, the navel ſtring, in anatomy. See FOETUS and NAVEL.

FUNNEL *of a chimney*, the ſhaft or ſmalleſt part of the waſte, where it is gathered into its leaſt dimenſions.

Palladio directs, that the funnels of chimneys be carried through the roof four or five feet at leaſt, that they may carry the ſmoke clear from the houſe into the air. See the article CHIMNEY.

He alſo adviſes, that chamber-chimneys be not made narrower than ten or eleven inches, nor broader than fifteen; for if too narrow, the ſmoke will not be able to make its way; and, if too wide, the wind will drive it back into the room.

FUNNEL-FASHIONED, or **FUNNEL-SHAPED-FLOWERS**, in botany. See the article INFUNDIBULIFORM.

FUR, or **FURR**, in commerce. See FURR.

FURBISHER, a perſon who furbiſhes, poliſhes, or cleans arms, as guns, ſwords, piſtols, &c. which is chiefly performed with emery. See the article EMERY.

FURCA and **FOSSA**, in our old cuſtoms, the power of gallows and pit, or a juriſdiction of puniſhing felons, *viz.* the men by hanging, and the women by drowning.

FURCA, in antiquity, a piece of timber reſembling a fork, uſed by the Romans as an inſtrument of puniſhment.

The puniſhment of the furca was of three kinds: the firſt only ignominious, when a maſter, for ſmall offences, forced his ſervant to carry a furca on his ſhoulders about the city. The ſecond was penal, when the party was led about the circus, or other place, with the furca about his neck, and whipped all the way. The third was capital, when the malefactor, having his head faſtened to the furca, was whipped to death.

FURCAM ET FLAGELLUM, the meaneſt of all ſervile tenures, the bondman being at the lord's diſpoſal for life and limb.

FURCHE, in heraldry, a croſs forked at the ends. See the article CROSS.

FURFUR, BRAN. See the article BRAN. From their reſemblance to bran, thoſe excrementitious particles which are evacuated with the urine, are alſo called furfures; and for the ſame reaſon this name is alſo given to the ſcabies or ſcurf of the head.

FURIES, *eumenides, diræ*, certain goddeſſes whoſe office it was to puniſh the guilty after death. Theſe were three in number; Alecto, Megæra, and Tiſiphone, who were deſcribed with ſnakes inſtead of hair, and eyes like lightening, carrying iron chains and whips in one hand, and in the other flaming torches; the latter to diſcover, and the former to puniſh the guilty; and they were ſuppoſed to be conſtantly hovering over ſuch perſons as had been guilty of any enormous crime.

Mythologiſts ſuppoſe, that Tiſiphone puniſhed the crimes which ſprang from hatred or anger; Megæra, thoſe from envy; and Alecto, thoſe from an inſatiable purſuit after riches and pleaſure. They were worſhiped at Caſina in Arcadia, and at Carmia in Peloponneſus. They had a temple at Athens, near the Areopagus, and their prieſts were choſen from amongſt the judges of that court. At Telphuſia, a city in Arcadia, a black ewe was ſacrificed to them.

FURLING, in the ſea-language, ſignifies the wrapping up and binding any ſail cloſe to the yard; which is done by hauling upon the clew-lines, bunt-lines, &c. which wraps the ſail cloſe together, and being bound faſt to the yard, the ſail is furled.

FURLING LINES, on ſhip-board, ſmall lines made faſt to the top-ſail, top gallant-ſail, and the miſen-yard-arms, to furl up the ſails by.

FURLONG, a long meaſure, equal to $\frac{1}{8}$ of a mile, or forty poles. See the articles MEASURE, MILE, and POLE.

It is alſo uſed, in ſome law-books, for the eighth part of an acre. See the article ACRE.

FURLOUGH, in the military language, a licence granted by an officer to a ſoldier, to be abſent for ſome time from his duty.

FURNACE, an utenſil, or veſſel, proper to contain fire; or to raiſe and maintain a vehement fire in, whether of coal or wood. See the article FIRE.

There are divers kinds of furnaces, of various forms, and for various purpoſes. A chemical furnace is a ſtructure of brick, iron, or ſtone, capable of containing, reſtraining, and applying fire to veſſels, wherein the chemical ſubjects are to receive the action of fire.

Hence a furnace requires, 1. A fire-place, wherein the fire is to be raiſed, kept up, and determined; and as artificial fire muſt be fed by fuel, a chimney becomes neceſſary to diſcharge the ſmoke; an aſh-pit, to admit the air; and a door, where the fuel is to be thrown in. 2. In erecting a furnace, care muſt be taken to build it ſo as to preſerve the ſtrength of the fire, or not to waſte it in vain; and this by directing it where it is particularly required. 3. A proper place muſt alſo be contrived, in which the veſſels containing the ſubjects may receive the requiſite degree of heat, for the requiſite time to finiſh the operation.

In the building of furnaces, regard muſt be had, 1. To the quantity of fire which the fire-place ought to receive, contain, and ſupport. 2. To the matter of the fuel to be uſed for the purpoſe. 3. To the degree of heat required in every operation; ſince in the ſame fire-place the ſame quantity of the ſame fuel may produce different degrees of heat. Whence, 4. The air muſt always have acceſs to the fire place; and the force with which the air tends to the fire, under the form of wind or blaſt, ſhould be computed. 5. The air-vent from the fire ſhould be principally regarded, for if this be wide, the air here diffuſes, and loſes itſelf; or acts but little upon the ſubject, where its force ought to be collected.

The firſt or moſt ſimple chemical furnace, according to Boerhaave, is conſtructed as follows. Make a hollow box, with a ſquare baſis, of ſound, dry oak, nine inches wide, and fourteen high. Into this fix a ſquare piece of wainſcot, one inch thick, and five inches from the baſis, ſo as to divide the furnace into two parts; the lower whereof, being five inches high, ſerves for the fire-place; and the upper, eight inches high, is to receive the retort for diſtillation. This piece of wainſcot, ſerving as a partition, muſt have a round hole in the middle, five inches over, where the round bottom of the veſſel is to reſt. Beſides this large hole in the partition, there muſt be four other round holes made in it, each an inch in diameter, that the heat of the fire may riſe freely from the fire-place into the ſecond ſtory. On one ſide of the fire-place there muſt be a door going upon hinges, and equal in dimenſions to the whole ſide, or nine inches broad, and five high, ſo as to open eaſy, and ſhut cloſe. The whole internal fire ſurface of this fire-place muſt be lined with plated iron or copper, to defend the wood from the fire. The door is to have four round holes made in it, each of them an inch in diameter, to admit the external air; and theſe holes are to be fitted with four cylindrical ſtoppers, to regulate the fire, by admitting and excluding the air. This door muſt be made of ſeaſoned wood, and made to ſhut extremely cloſe. In the upper part of the furnace, the ſide above the door muſt have a ſquare hole cut in the middle, to the top of it, four inches and a half over; the inner edge of which is to be cut away on its three ſides to half the thickneſs of the board, or to the breadth of half an inch. And to the internal ſloping ſurface about this hole, a plate of wood muſt be ſo fitted as to make a joint; this being of uſe to ſhut the ſide of the furnace cloſe, when we deſign to diſtil, digeſt, or exhale in a cucurbit, phial, or evaporating glaſs: whereas the plate of wood being taken away, fits the furnace for diſtillation by the retort. There muſt alſo be another ſimilar plate of wood with a hole in the middle, two

inches

Fig. 1.

FULLING-MILL.

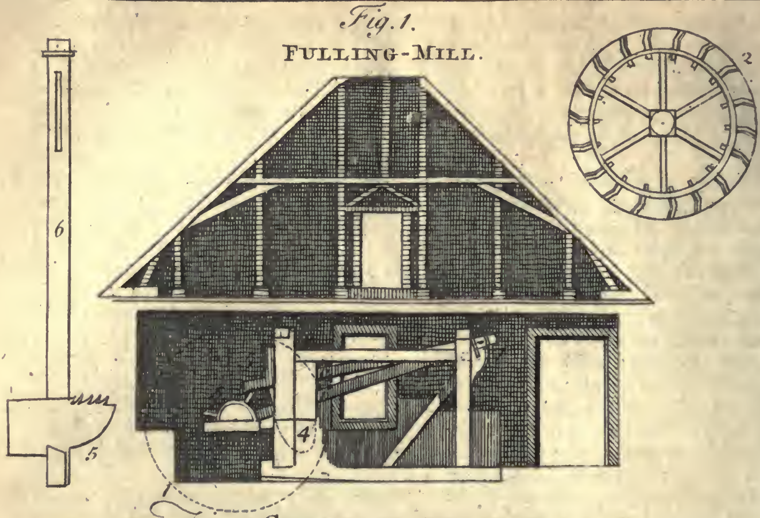
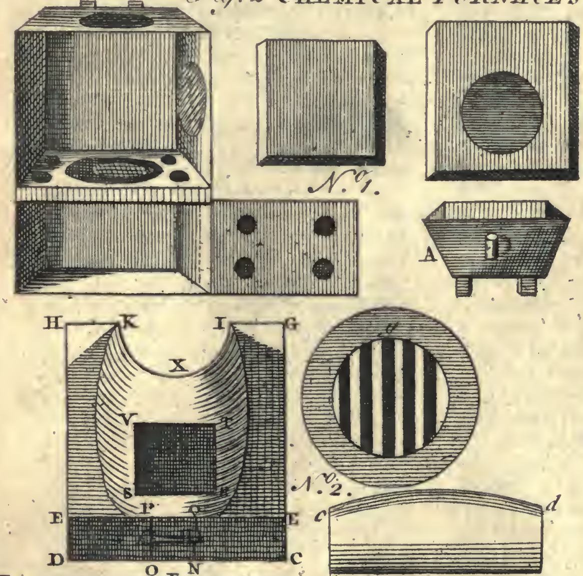
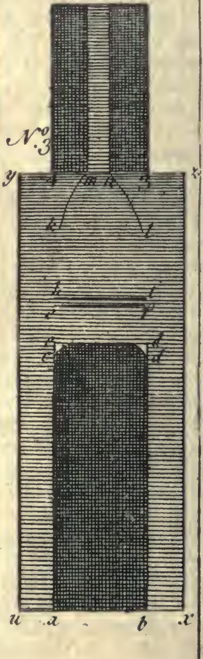


Fig. 2 CHEMICAL *FURNACES.*





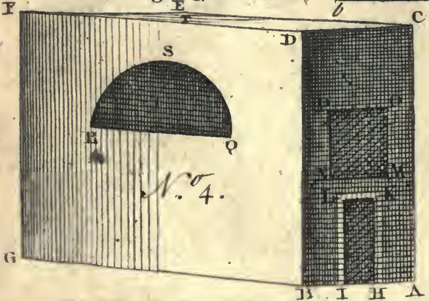
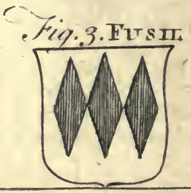


Fig. 3. FUSIL.



T. Jefferys sculp

inches and a half over, ſo as to let the neck of the retort paſs through it, when fitted into the ſquare hole, inſtead of the former. A pair of folding-doors ſhould alſo be made to ſerve as the flat top, or cover to the furnace; the middle part of which doors muſt be cut into a round hole of five inches diameter, to let out the neck of the cucurbit or bolt head, uſed in digeſtion. In the laſt place, there muſt be a round flat piece of wood, ſix inches in diameter, to cover this upper orifice, when the furnace is uſed for diſtilling by the retort. See a view of this furnace in plate CVIII. fig. 2. nº 1. In order to work this furnace, we muſt be provided with a ſquare flat-bottomed earthen pan, (*ibid.* A) ſtanding upon three feet, about half an inch high; the height of the pan being from the bottom of the furnace to its upper rim three inches and an half: at the bottom of this pan a little ſifted aſhes muſt be lightly ſprinkled, a quarter of an inch thick; then an ignited coal of dutch turf, firſt burnt till it yields no longer ſmoke, is to be laid upon this bed of aſhes, and covered by ſifting more of the ſame aſhes lightly upon it, whereby an equable, moderate heat may be kept up for near twenty-four hours.

This furnace works without yielding any ſmoke or diſagreeable ſmell, and affords ſo gentle and equable a heat, that in the opinion of Boerhaave, eggs may be hatched by it: tho' it may be raiſed high enough to make water boil, or higher; and of courſe will commodiouſly perform all kinds of digeſtions and diſtillations of aqueous and ſpirituous liquors, volatile alkaline ſalts, and volatile aromatic ſalts, or tinctures, exhalations, &c.

If a furnace be required capable of giving a ſtronger heat, ſo as to diſtil in ſand, the beſt contrivance, according to Boerhaave, is the following, for making portable furnaces, theſe being the moſt commodious, on account of leaving the chimney of the laboratory free. Let a hollow cylinder, C G H D, (*ibid.* nº 2.) be made of thin iron-plate, ſeventeen inches in diameter, and nineteen inches high; the lower end to be cloſed, and the upper end open. Let the bottom be ſupported with three iron feet, twelve inches long; and let the iron bottom be covered on the inſide with a copper-plate, leſt the ſalt in the aſhes ſhould otherwiſe ſoon corrode the iron. Let a grate, *y*, be fixed in this cylinder, ſo that the upper ſurface thereof, being parallel to the baſe of the cylinder, may riſe four inches above it. Let the grate be ſurrounded with a flat ring of plated iron, three inches and an half broad. Let the bars of the grate be flat, half an inch wide, and ſet at the diſtance of an inch from each other. This iron rim of the grate muſt reſt upon three pins ſticking out by the inſide of the furnace, to fix the grate. Let the aſh-place, N O P Q, be fitted with an iron door, four inches high, and ſix inches wide, to move upon hinges, and ſhut exactly cloſe. At the height of three inches from the upper ſurface of the grate, let the bottom of the fire-place, T R S V, begin, and make the whole ſix inches wide, and four inches and an half high.

Next deſcribe an ellipſis, I L M K, with the diſtance of fifteen inches between the foci, and a perpendicular of five inches from the focus to the circumference; and make a wooden model, *b c d e*, of half ſuch an ellipſis, cut off at the foci. This model is to ſerve as a core in forming the cavity of the furnace, by adjuſting fine brick-work in correſpondence to the figure made by revolving ſuch a model about its axis; and thus leaving but little ſpace between the joinings, to be exactly filled up with mortar. But before this is done, let a ſtopper be made for the fire-place of the ſame iron-plate, and the ſame cylindrical ſurface, and internal ſubſtance, as the furnace itſelf. The top of the cylindrical part of the furnace, K X I, muſt be cut into a hollow, three inches wide, and two deep, on the ſame ſide with the door, in order commodiouſly to receive the neck of the retort in diſtillation. Laſtly, an iron pot muſt be fitted into the upper opening of the furnace, K X I, and fixed ſo cloſe and ſtrong with brick and mortar, that the work may neither crack nor let the fire eſcape; but near the upper rim in this pot, there muſt be left in the brick-work four vent-holes, made in the form of creſcents, an inch over in their wideſt parts, and two inches in their curvature, to diſcharge the ſmoke, and make a draught of air to animate the fire occaſionally. And thus you will have a furnace fit for diſtilling by the cucurbit, retort, or bolt-head, and being portable, it will ſerve many other operations.

The third furnace, which no laboratory can be without, is a balneum mariæ, made like the two former, excepting that the diſtance from the ſurface of the grate to the bottom of the cylindrical copper-veſſel, is only eight inches. See the article BALNEUM.

A fourth furnace is alſo required in a laboratory, to raiſe a ſtrong fire for the melting of bodies not eaſily fuſed; the beſt furnace for which purpoſe, is made thus. Let a ſtone-arch, *a b c d*, (*ibid* n° 3.) be built three feet high, as a baſis whereon to raiſe this furnace; then make an aſh-hole, *c d e f*, five inches high; and over that fix a grate, *e f i h*, conſiſting of iron bars, near an inch thick, and ſet at about an inch diſtance from each other. Let the bottom of the grate, and the aſh-hole, be of a circular figure, twelve inches in diameter, *a b*, *c d*, *e f*, *h i*; and build up the cylinder ſix inches above the grate; then raiſe upon it a parabolic cone, *k m n l*, with an axis of eight inches, and its lower ordinate of ſix. Over this parabolic cone, build a cylindrical chimney of three inches diameter, and two feet high. In the front of the fire-place, two inches above the grate, make a door five inches wide, and ſix high, and arch it a-top with the arch of a circle, twelve inches in diameter. At the height of an inch above the arch of the door, make a conical hole in the furnace, two inches wide on the outſide, that the operator may look downwards into the fire when any thing is melting, and let a ſtopper be exactly fitted to this opening. The furnace, *a u y 4 b z x 3*, muſt be built with good brick and terras, and have its ſides five inches thick, the internal ſurface thereof being laid ſmooth with cement.

A fifth furnace, A B C D, (*ibid.* n° 5.) for diſtilling mineral acids, as thoſe of ſea-ſalt, nitre, alum, vitriol, &c. is directed by Boerhaave to be built in the following manner. Upon the pavement of the laboratory, under the chimney, build up a parallelopiped, twenty inches broad in front, A B, and twenty-eight inches long, B G. Let the cavity be twelve inches wide in front, and twenty-two inches long, which gives the thickneſs of the wall. Let the parallelopiped be raiſed eleven inches high. Make a door-way, H K L I, in the middle of the front, riſing eleven inches from the ground, and four inches wide, leaving an indenture on the front to receive an iron door; and let it cloſe occaſionally. This part of the apparatus regards the aſh-hole and air-vent of the furnace. Inſtead of a grate, here uſe priſmatic iron-bars, an inch wide, and fourteen inches long, placing them an inch aſunder, parallel with the breadth of the aſh-hole. Now deſcribe an ellipſis in the upper cavity upon this parallelopiped, with the foci twenty two inches aſunder, and the tranſverſe diameter twelve inches; whence the breadth of the fire-place will be at both ends about ten inches. Next let there be a cavity formed, of this elliptical figure, four inches and a half deep, on the inſide; and complete the external part of it in a parallelopiped-form. In the front-wall, immediately over the aſh-hole, make a door-way, P O M N, ſeven inches wide, and nine inches high; and let the bottom edge of this door-way ſlope an inch and a half downwards, and let the lower line of the door be three inches above the upper line of the aſh-hole. In the other ſide there muſt be an arched opening, R S Q, with its lower limit riſing ten inches above the grate, being twenty inches long, and twelve inches high; and the elliptical arch with its foci, twenty inches aſunder, and its tranſverſe diameter twenty four. This opening is for the diſtilling veſſels to be put in and taken out. On the internal ſide, oppoſite to this opening, at the height of nine inches above the grate, a ledge of about an inch and a half muſt be left to ſupport the veſſels employed in the diſtillation; and in the middle of the upper part of this wall, there muſt be a ſquare hole, three inches wide, and two inches high, for the chimney. The upper elliptical arch muſt next be made, whoſe vertex is to riſe twenty-one inches above the grate, the axis of the ellipſis twenty-two inches, and the tranſverſe diameter ten. Let ſuch an arch therefore be ſtruck by revolving ſuch an ellipſis about its axis, reaching ſixteen inches from the grate.

When this furnace is uſed for diſtillation, two alembics are to be placed horizontally, and parallel to each other, ſo that their bottoms may reſt upon the ledge in the oppoſite wall, whilſt their mouths lie parallel to the opening they are put in at; which opening is now to be perfectly cloſed up with brick and mortar, leaving the necks of the veſſels ſticking out, whereto earthen pipes being applied, and their other ends fixed to receivers, the operation may be thus begun. See the articles ALEMBIC and DISTILLATION.

For other chemical furnaces, ſee the article LABORATORY.

FURNACE is alſo applied to that uſed in the melting of iron, which authors frequently confound with iron-forges, tho' there is a conſiderable difference between them. See the article FORGE.

This furnace is a brick-ſtructure, much in the ſhape of an egg ſet on end, wherein the iron-ore, after it has been burnt in a kiln, is put, intermixed with cinders and charcoal, and the whole melted till it trickle down into the receiver underneath. See the article FLUX.

Swedenborg has laid down, from his own experience, certain rules for the conſtruction of metallurgic furnaces, by which they will always be made more advantageous to the proprietor, *cæteris paribus*, than any other kind. Theſe rules are, that the chimney be always placed as nearly as may be behind the center of the furnace; that the ſmaller the depth of the fire-place, provided it be ſufficient to hold the coals, the better; that all furnaces muſt be the better the wider they are forwards; and the higher they are, ſo as not to loſe the benefit of reverberation.

Bellows-FURNACE, is one of the two kinds of furnaces uſed in coinage for the fuſion of metals, conſiſting of a flat hearth at bottom, into which the air may be admitted by a hole, as in the chemical furnaces. On a level with the hearth is a ſecond aperture, which gives paſſage to the pipe of the bellows, from whence the furnace is denominated; about a foot over this is a moveable grate; and over this is the place where the crucible is ſet, which is ſquare, and made of the ſame earth with the crucible, of breadth ſufficient to bear a range of coals around the crucible. To melt metal in this furnace, they lay a little plate of forged iron over the grate, and on this they ſet the crucible, which is likewiſe covered with an iron or earthen lid; then they fill the furnace with charcoal, and when it is well lighted, and the crucible ſufficiently hot, they ſtop the vent-hole: laſtly, throwing on freſh coals, they ſtop the furnace with an iron lid; thus continuing to work the bellows, and ſupply freſh fuel, till the metal is in fuſion.

Domeſtic FURNACE. See OVEN.

Founder's FURNACE. See FOUNDERY.

Glaſs-houſe FURNACE. See GLASS.

Glaſs-painter's FURNACE is made of brick, nearly ſquare, and about 2½ feet each way. It is cut horizontally in the middle by a grate, which ſuſtains the pan or ſhovel the glaſs is baked in. This furnace has two apertures, one below the grate, to put the fuel in at; the other above it, through which the workman ſpies how the action of the colours goes on.

Hatter's FURNACES are of three kinds: a little one under the mould, whereon they form their hats; a larger in the ſcouring-room, under a little copper, full of lees; and a very large one under the great copper, wherein they dye their hats.

Plumber's FURNACE is alſo of three kinds. In the firſt they melt the lead whereof the ſheets are to be caſt, being only a large copper, or receptacle like a copper, made of free-ſtone, and coated well round with potter's clay, having a little iron-pan at bottom.

In the ſecond they melt the lead to be caſt in moulds for pipes, *&c.* which are not to be ſoldered.

The third is the tinning furnace, being a ſquare frame of wood, or ſometimes a maſs of ſtone work, with a brick hearth whereon is made a charcoal fire, which ſerves them for the applying of thin tin leaves on their works.

Wind FURNACE, the ſecond furnace uſed in the fuſion of metals for coinage. At bottom it has a hearth made hollow, in manner of a copel, with a vent-hole in the forepart thereof; over the vent-hole is a grate, ſealed in the maſſive of the furnace; over the grate is the place for the crucible, which is uſually of forged iron. The fire being lighted, the crucible is put in, with a cover over it, and a capital or cover of earth or iron, is laid likewiſe over the furnace; and at the top of this capital is a hole, five or ſix inches in diameter. This is called a wind-furnace, by reaſon the air entering thro' the vent-hole at bottom, which is always open, ſerves the ſame purpoſe as the bellows in the other furnaces. Gold is generally melted in the bellows furnace, as requiring an intenſer heat before it fuſes; but ſilver and copper are commonly melted in the wind-furnace.

FURNAGE, or **FORNAGE**. See the article FORNAGE.

FURNES, a town of Flanders, ten miles eaſt of Dunkirk: eaſt long. 2° 25′, and north lat. 51° 10′.

FURNITURE *of dials*, certain additional points and lines, ſuch as the ecliptic, circles of declination, azimuths, italian hours, points of the compaſs, *&c.* drawn on dial-plates. See the article DIAL.

FURO, in zoology, a name given to the viverra, or ferret. See FERRET.

FUROR UTERINUS, a diſorder peculiar to women, proceeding from an inordinate deſire of coition, ſometimes attended with melancholy, and ſometimes with a maniacal delirium. The patient delights in talking obſcenely, and in ſoliciting men to ſatisfy their deſires both by words and geſtures.

It is occaſioned by an inflammation of the pudenda, or of the parts in which the venereal ſtimulus reſides, which are chiefly the clitoris and vagina; or in the too great abundance and acrimony of the fluids of thoſe parts; or both theſe cauſes may exiſt together.

In the delirium maniacum, the patient is entirely ſhameleſs; but in the melancholicum more reſerved, and her folly is confined to fewer objects. If it continues a month or two, the fault of the brain becomes obſtinate, for it degenerates into real madneſs.

The indications of cure are to diminiſh the heat and ſenſibility of the affected parts, to cool, ſweeten, and dilute the blood, and ſo render it balſamic; or to purſue both intentions at once. The firſt indication is anſwered by frequent and copious bleeding: ſhe muſt likewiſe be purged with jalap, ſcammony, or diagridium. Emetics are alſo good; and emollient clyſters ſhould be given; to which add a dram and a half of ſal prunella, or a little vinegar, morning and night. To abate the acrimony, the patient may drink mineral waters, or emulſions with chicken-broth, and ſeeds of papav. alb. lin. cannabis, *&c.* and ſweetened. In the ſummer, whey with half a drachm of ſal prunel. for each doſe. After which ſhe ſhould be kept to a milk diet only.

In a delirium melancholicum, lawful coition may be admitted.

FURR, in commerce, ſignifies the ſkin of ſeveral wild beaſts, dreſſed in alum with the hair on, and uſed as a part of dreſs by princes, magiſtrates, and others. The kinds moſt in uſe are thoſe of the ermine, ſable, caſtor, hare, coney, *&c.* See the articles ERMINE, SABLE, *&c.*

Furrs are charged with various duties. Badger-ſkins pay, the piece, $5\frac{74\frac{1}{2}}{100}$ d. whereof $5\frac{17\frac{1}{2}}{100}$d. is drawn back on exportation. Bear-ſkins, if black or red, pay each 4 s. $9\frac{45}{100}$d. and draw back 4 s. $3\frac{75}{100}$d. but if white, each ſkin pays 9 s. $6\frac{90}{100}$d. and draw back 8 s. $7\frac{50}{100}$d. Beaver ſkins pay each $7\frac{18\frac{1}{8}}{100}$d. and draw back $4\frac{34\frac{2}{16}}{100}$d. Cats-ſkins, the hundred, containing five ſcore, pays 9 s. $6\frac{90}{100}$d. and draw back 8 s. $7\frac{70}{100}$d. Ermines, the timber, containing forty ſkins, pay 9 s. $6\frac{90}{100}$d. and draw back 8 s. $7\frac{1}{2}$ d. Fox-ſkins, the ordinary kind, pay only $3\frac{83}{100}$d. each, and draw back $3\frac{45}{100}$d. but each black fox ſkin pays 2 l. 7 s. $10\frac{50}{100}$d. and draws back 2 l. 3 s. $1\frac{50}{100}$d. Leopard-ſkins, the piece, pay 5 s. $11\frac{81\frac{1}{4}}{100}$d. and draw back 5 s. $4\frac{68\frac{3}{4}}{100}$d. Matrons, the timber, containing forty ſkins, pay 2 l. 7 s $10\frac{50}{100}$d. and draw back 2 l. 3 s. $1\frac{50}{100}$d. Mole-ſkins, the dozen, pay $1\frac{43\frac{5}{8}}{100}$d. and draw back $1\frac{29\frac{3}{8}}{100}$d. Otter-ſkins, the piece, pay 1 s. $2\frac{36\frac{1}{4}}{100}$d. and draw back 1 s. $\frac{93\frac{3}{4}}{100}$d. Ounce-ſkins, the piece, pay 2 s. $11\frac{00\frac{5}{8}}{100}$d. and draw back 2 s. $8\frac{34\frac{3}{8}}{100}$d. Sables of all ſorts, the timber, containing forty ſkins, pay 7 l. 3 s. $7\frac{50}{100}$d. and draw back 6 l. 9 s. $4\frac{50}{100}$d. Weazle-ſkins, the dozen, pay $\frac{95\frac{3}{4}}{100}$d. and draw back $\frac{86\frac{1}{4}}{100}$d. Wolf-ſkins tawed, the piece, pay 7 s. $2\frac{17\frac{1}{2}}{100}$d. and draw back 6 s. $5\frac{62\frac{1}{2}}{100}$d. Wolf-ſkins untawed, the piece, pay 5 s. $6\frac{6\frac{1}{4}}{100}$ l. and draw back 4 s. $11\frac{51\frac{1}{4}}{100}$. If any furrs be tawed, or otherwiſe dreſſed, they pay 6 s. more for every 20 s. value.

Furrs, in heraldry, a bearing which repreſents the ſkins of certain beaſts, uſed as well in the doubling of the mantles belonging to the coat-armour, as in the coat-armours themſelves. See the articles Ermin, Erminois, *&c.*

Furr, among carpenters, a piece nailed upon a rafter, to ſtrengthen it when decayed, or to make it ſtraight when it has ſunk in the middle.

FURRING, among carpenters, is the regular faſhioning out any part. When the main piece of the material is ſcanty, either by defects, wains, or want of thickneſs; then a piece of the ſame is put behind it to make good its thickneſs, which is called a furr.

FURSTENBURG, a town and caſtle of Germany, the capital of a county of the ſame name, thirty miles north-weſt of Conſtance: eaſt long. 8° 30′, and north lat. 47° 50′.

FURSTENFIELD, a town of Auſtria and dutchy of Stiria, thirty-ſix miles eaſt of Gratz: eaſt long. 16° 46′, and north lat. 47° 26′.

FURUNCLE, or Boil, in ſurgery, a ſmall reſiſting tumour, with inflammation, redneſs, and great pain, ariſing in the adipoſe membrane, under the ſkin.

As there is no part of the body free from being the ſubject of furuncles, ſo the whole is ſometimes ſo miſerably infeſted with them, that the patient can hardly tell how to ſtir himſelf, or on what part to lie. Not only adults, but alſo the younger, even new-born infants, are obnoxious to this dreadful diſorder, which occaſions in them moſt fatiguing clamour and reſtleſſneſs. Though there is little danger in this diſeaſe in adults; yet, in tender infants, it occaſions convulſions, and even death itſelf.

The principal cauſe of furuncles is a too glutinous and inſpiſſated ſtate of the blood; and, conſequently, the greater the inſpiſſation, the worſe and more numerous will be the furuncles.

With regard to the cure, it ſeems to conſiſt chiefly in reſtoring the ſtagnating blood to its former circulation and free motion.

When the furuncles are very numerous, or return again, it is proper to uſe internal purging medicines, and ſuch as attenuate and cleanſe the blood. In adults, bleeding is proper, both by the lancet and ſcarification with cupping; and, at the ſame time, a ſtrict regimen of diet ſhould be uſed, drinking frequently and plentifully of a decoction of the woods, and ſuch like attenuators of the blood. The patient ſhould alſo entirely abſtain from drinking fermented and ſpirituous liquors, particularly wine and its ſpirit; and from the too frequent uſe of tobacco.

When the diſorder is recent, external medicines only will frequently ſuffice for the whole cure. For this purpoſe a mixture of honey, acidulated with ſpirit of vitriol till it has acquired a conſiderable ſharpneſs, is proper to anoint the furuncles. Of no leſs virtue is the frequent touching them with mere ſpirit of vitriol or ſulphur. Diſcutient plaſters are alſo found very ſerviceable, as thoſe of ſimple diachylon, de melito, de ſperma ceti, vel diaſaponis.

But if theſe medicines prove inſufficient to diſperſe the tumour, it is to be brought to ſuppuration, by applying a plaſter made of honey and flour, or of diachylon with the gums; and where theſe are inſufficient, to make uſe of the maturating cataplaſms recommended under the article Phlegmon.

When the furuncle is known to be ripe, by its ſoftneſs and yellow head, recourſe is to be directly had to the ſcalpel; and having made an opening, the corrupted matter contained therein is to be diſcharged: after this, a plaſter of diachylon muſt be applied, and the ulcer daily cleanſed of its matter, till it is healed.

Puſtules and pimples ariſing in the face, are to be treated like furuncles; and, in both caſes, the drinking of whey, and the mineral waters, is accounted good for cleanſing the blood.

When ſucking infants are afflicted with furuncles, it is proper to give the mother, or nurſe, ſome purging medicine, and to order a ſtrict regimen and diet. At the ſame time the infant ſhould take ſome gentle laxative medicine, with abſorbent powders, to allay the acrimony of its juices.

Furunculus, in zoology, a name given to the ferret. See the article Ferret.

FURZE, or Furze-bush, in botany. See the article Ulex.

In many countries, where there are dry banks, or dry ſand or gravel, that nothing elſe will grow on, furſe makes an extremely good fence; and is propagated either by ſets or ſeeds, eſpecially the latter. It will make a good hedge in three years, if well weeded and carefully kept from cattle, eſpecially ſheep; and if clipped, it will thrive extremely, and be very

very thick; but if let grow at large, it will prove the better ſhelter, and yield excellent fuel. It proves alſo an admirable covert for wild-fowl.

Sometimes, indeed, furze over-runs the paſture, or arable-lands; in which caſe it is to be grubbed up, or it may be deſtroyed by only marling the lands.

Furze faggots are uſed for breeming ſhips, when in the dock to be cleaned, or under repair.

FUSAROLE, in architecture, a moulding or ornament placed immediately under the echinus, in the doric, ionic, and compoſite capitals.

It is a round member carved in the manner of a collar, or chaplet, with oval beads; and ſhould always anſwer exactly under the eye of the volute, in the ionic capital.

FUSEE, in clock-work, is that conical part drawn by the ſpring, and about which the chain or ſtring is wound; for the uſe of which, ſee the articles CLOCK and WATCH.

FUSEE, or FIRELOCK. See the article MUSQUET.

FUSEE *of a bomb*. See the article BOMB.

FUSIBILITY, in natural philoſophy, that quality of bodies, which renders them fuſible. See the article FUSION.

FUSIBLE COLUMN. See COLUMN.

FUSIL, in heraldry, a bearing of a rhomboidal figure, longer than the lozenge, and having its upper and lower angles more acute and ſharp than the other two in the middle. It is called in latin *fuſus*, a ſpindle, from its ſhape. See plate CVIII. fig. 3.

FUSILIERS, or FUSILEERS, in the military art, are foot-ſoldiers, armed with fuſees, or firelocks. See FUSEE.

FUSILY, or FUSILE', in heraldry, ſignifies a field, or ordinary, entirely covered over with, or divided into fuſils. See the article FUSIL.

FUSION, the melting of metals, minerals, &c. by means of fire.

Different metals run in different manners from their ores: thus, lead, though extremely fuſible in the metal, runs with difficulty from the ore, ſo as to require a conſiderable violence of fire. This ſtubbornneſs not belonging to the metal, muſt be attributed to the ſtony, ſulphureous, or other mineral matter with which the ore is mixed; which matter ſeems to require a degree of heat capable of vitrifying the lead, before the metal will run; but then the lead thus vitrified, recovers a metallic form again, by coming in contact with the coals. See LEAD.

Tin runs from its ore with greater eaſe than lead, and is therefore ſmelted in much leſs furnaces: but copper requires an intenſe heat, or a blaſt furnace; and iron the greateſt heat that can be given in a furnace: and both iron and copper abſolutely require immediate contact with the fuel employed. Hence it appears that each metal muſt have its determinate degree of heat, to run it with advantage from the ore or ſtone.

In order, likewiſe, to obtain the metal from the ore to the beſt advantage, the ſcoria or ſlag muſt be neceſſarily made to run thin and fluid; otherwiſe it entangles or inviſcates the metal, and will not let it ſeparate fully. And hence we frequently obſerve in the aſſaying of copper-ores, ſmall grains of metal interſperſed here and there, among the ſcoria, that require to be ſeparated by ſtamping and waſhing the whole maſs; which labour might have been prevented, by uſing a proper degree of heat capable of procuring a thin fuſion and a ſuitable flux, ſo as to have made all the metals fall to the bottom of the crucible; which it conſtantly does, when the operation is well performed. See FLUX.

It ſeems principally owing to a defect in the knowledge of fuſion, that ſo many recrements or ſlags of metals, antiently thrown as uſeleſs from the furnace, have been of late wrought to conſiderable profit by more ſkilful workmen: at leaſt it ſeems more rational to attribute the ſucceſs to this cauſe, than to a ſuppoſed growth of metals in ſuch ſlags; or to believe that lead has grown rich in ſilver by lying expoſed to the open air, while perhaps it is rather owing to the unſkilfulneſs of the former workmen, who were unable to ſeparate all the ſilver contained in the lead.

All moiſture, and too ſudden cooling, prove prejudicial to the more ignoble metals after fuſion, and ſometimes dangerous to the operator: for a little water falling upon melted iron or copper, makes them expand with prodigious violence, and diſcharge themſelves abroad with a force like that of a cannon: and even ſudden cooling will often occaſion the ſurface of the metal to crack, and ſuffer the more internal part, not yet ſet or fixed, to iſſue out to a conſiderable diſtance; whence either the loſs of the metal or miſchief may enſue.

To prevent theſe ill effects, after copellation it is uſual for the operator to throw a quantity of water, all at once, upon the lump of ſilver, as it lies in the teſt, at the moment when it begins to grow rigid; for the water, by its coldneſs, ſuddenly makes ſo thick a cover upon the ſurface of the ſilver, that the hotter parts in the inſide cannot break thro' the upper.

For the manner of making ſteel by fuſion, ſee the article STEEL.

FUST, the ſame with the ſhaft of a column. See COLUMN and SHAFT.

FUSTIAN, in commerce, a kind of cotton ſtuff, which ſeems as it were whaled on one ſide.

Right fuſtians ſhould be altogether made of cotton-yarn, both woof and warp; but a great many are made, of which the warp is flax, or even hemp.

There are fuſtians made of ſeveral kinds, wide, narrow, fine, coarſe; with ſhag or nap, and without it.

The duties on fuſtians imported, are ſo high as to amount in a manner to a prohibition: for inſtance, dutch and milan fuſtians, the piece, containing two half pieces of fifteen yards the half piece, pay 1 l. 10 s. 9$\frac{60}{100}$d. draw back 1 l. 7 s. Holmes and bevernex fuſtians, the bale, containing forty-five half pieces, pay 15 l. 8 s. draw back 13 l. 10 s. Naples fuſtians, tripe or velure plain, the yard, pay 1 s. 11$\frac{10}{100}$d. draw back 1 s. 8$\frac{25}{100}$d. Naples fuſtians, wrought, called ſparta velvet, the yard pay 3 s. $\frac{96}{100}$d. draw back 2 s. 8$\frac{40}{100}$d.

FUSTICK, or FUSTOCK, a yellow wood, that grows in all the Caribbee-iſlands, uſed in dying yellow.

It pays no duty on importation.

FUTTOCKS, in a ſhip, the timbers raiſed over the keel, or the encompaſſing-timbers that make her breadth. Of theſe there are firſt, ſecond, third, and fourth, denominated according to their diſtance from the keel, thoſe next it being called firſt or ground futtocks, and the others upper-futtocks: thoſe timbers, being put together, make a frame-bend.

FUTURE, in general, denotes whatever regards futurity, or the time to come. See the article TIME.

FUTURE TENSE, among grammarians. See the article TENSE.

FUZEE, or FUSEE, in military affairs. See the article FUSEE.

FUZEE, among farriers, two dangerous ſolents, joining from above downwards. They differ from ſcrews or thorough ſplents in this, that the latter are placed on two oppoſite ſides of the leg. See the article SPLENT.

FUZILIER, or FUSILIER, in the art of war. See the article FUSILIERS.

G.

G, in grammar, the ſeventh letter and fifth conſonant of our alphabet; but in the greek, and all the oriental languages, it occupies the third place. It is one of the mutes, and cannot be ſounded without the aſſiſtance of ſome vowel. Its ſound is formed by ſhutting the teeth gently together, ſo as ſcarce to touch, by a ſmall incurvation of the ſides of the tongue upwards, with the top touching the palate, at the ſame time that the breath is pretty ſtrongly preſſed through the lips a little opened.

In engliſh it has a hard and ſoft ſound; hard, as in the word *game*, *gun*, *&c.* and ſoft, as in the word *geſture*, *giant*, *&c.* at the end of words, *gh* is pronounced like *ff*, as in the words *rough*, *tough*, *&c.* The letter *g* is alſo uſed in many words where the ſound is not perceived, as in *ſign*, *reign*, *&c.*

As a numeral, G was antiently uſed to denote 400; and with a daſh over it, thus $\overline{\text{G}}$, 400 000. In muſic it is the character or mark of the treble cleff; and from its being placed at the head, or marking the firſt ſound in Guido's ſcale, the whole ſcale took the name gamut. See the article CLEF and GAMUT.

As an abbreviature, G. ſtands for Gaius, Gellius, gens, genius, *&c.* G. G. for gemina, geſſit, geſſerunt, *&c.* G. C. for genio civitatis, or Cæſaris. G. L. for Gaius libertus, or genio loci. G. V. S. for genio urbis ſacrum. G. B. for genio bono. And G. T. for genio tutelari.

GABARA, or **GABBARA**, in antiquity, the dead bodies which the Egyptians embalmed, and kept in their houſes, eſpecially thoſe of ſuch of their friends as died with the reputation of great piety and holineſs, or as martyrs. See the articles EMBALMING and MUMMY.

GABEL, a word met with in old records, ſignifying a tax, rent, cuſtom, or ſervice, paid to the king, or other lord.

GABEL, or **GAVEL**, among builders. See the article GAVEL.

GABEL, according to the french duties or cuſtoms, a tax upon ſalt, which makes the ſecond article in the king's revenue, and amounts to about one fourth part of the whole revenue of the kingdom.

GABIN, a town of Great Poland, forty-ſix miles north weſt of Warſaw: eaſt long. 20°, and north lat. 52° 35′.

GABIONS, in fortification, baſkets made of ozier-twigs, of a cylindrical form, ſix feet high, and four wide; which being filled with earth, ſerve as a ſhelter from the enemies fire.

They are commonly uſed on batteries, to ſcreen the engineers, *&c.* in order to which, one is placed on either ſide of each gun, room being only left for the muzzle to appear through. They alſo ſerve as a parapet on lines, lodgements, *&c.* when the ground is too hard to dig into. There are a ſmaller ſort, uſed on parapets in trenches, *&c.* to cover the muſqueteers; which are placed ſo cloſe, that a muſquet can juſt peep through.

To render the gabions uſeleſs, the enemy endeavours to ſet them on fire, by throwing pitched faggots among them.

GABLE, or **GAVEL**, among builders. See the article GAVEL.

GABLOCKS, the artificial ſpurs of game-cocks. See the article GAME-COCK.

GABRES, or **GAURS**, in the religious cuſtoms of Perſia. See GAURS.

GAD, among miners, a ſmall punch of iron, with a long wooden handle, uſed to break up the ore.

One of the miners holds this in his hand, directing the point to a proper place, while the other drives it into the vein, by ſtriking it with a ſledge-hammer.

GAD-FLY, or **BREEZE-FLY**, names given to the black and yellow bodied œſtrus, a fly nearly as large as the common blue fleſh-fly. See the article OESTRUS.

GADUS, in ichthyology, a genus of malacopterygious fiſhes, the head of which is uſually compreſſed; the branchioſtege membrane on each ſide contains ſix ſmall bones; and the back-fins are either two or three in number.

This is a large genus, comprehending the whiting, cod, haddock, ling, whiſtle-fiſh, *&c.* See WHITING, COD, *&c.*

GADWAL, in ornithology, a ſpecies of duck, about the ſize of a widgeon. See the article DUCK.

GAFOLD-LAND, in old law-books, land liable to taxes, and let for rent.

GAGATES, JET, in natural hiſtorry. See the article JET.

GAGE, in law-books, the ſame with ſurety of pledge. See the articles SURETY and PLEDGE.

Thus, where a perſon has taken diſtreſs, and being ſued in replevin, he ſhall not only avow the diſtreſs, but gager deliverance; that is, put in ſureties, or pledges, that he will deliver them. See the article DISTRESS.

GAGE is alſo uſed in a ſynonymous ſenſe with wage. See the article WAGE.

Mort-**GAGE**. See MORTGAGE.

GAGE, in the ſea-language. When one ſhip is to windward of another, ſhe is ſaid to have the weather-gage of her. They likewiſe call the number of feet that a veſſel ſinks in the water, the ſhip's gage; this they find by driving a nail into a pike near the end, and putting it down beſide the rudder till the nail catch hold under it; then as many feet as the pike is under water, is the ſhip's gage.

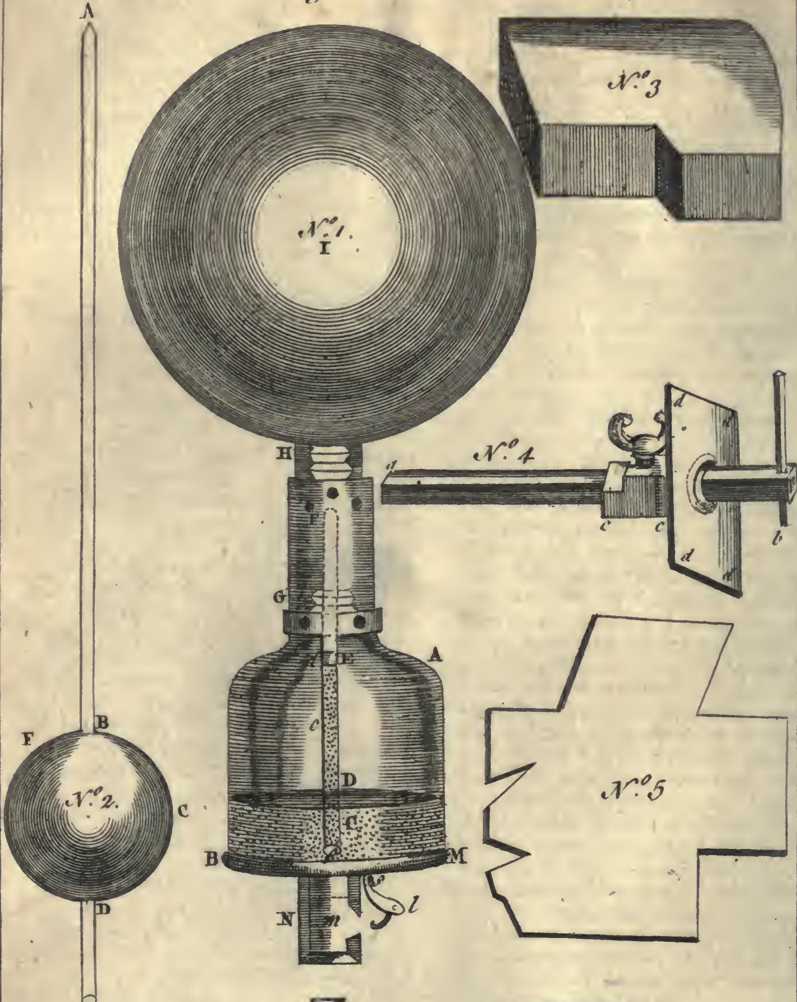
GAGE, in joinery, an inſtrument marked G, in Plate of Joinery, in which the piece of wood *b*, is moveable upon the ſtaff *c*, ſo as to be ſet nearer or farther from the tooth *a*, at pleaſure. Its uſe is to draw a line parallel to the ſtraight ſide of any board, for gaging tenons, and marking ſtuff to an equal thickneſs.

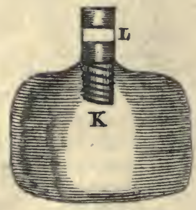
GAGE, among letter-founders, a piece of box, or other hard-wood, variouſly notched; the uſe of which is to adjuſt the dimenſions, ſlopes, *&c.* of the different ſorts of letters. See the article FOUNDERY and LETTER.

There are ſeveral kinds of theſe gages, as the flat-gage, repreſented in plate CIX. fig. 1. n° 3. and the face-gage and italic-gage, *&c.* *ibid.* n° 5.

Sliding-**GAGE**, a tool uſed by mathematical inſtrument makers, for meaſuring and ſetting off diſtances. It is alſo of uſe in letter-cutting, and making of moulds. See plate CIX. fig. 1. n°. 4. where *a a* is the beam, *b* the tooth, *c c* the ſliding ſocket, and *d d d d* the ſhoulder of the ſocket.

Fig. 1. GAGES.





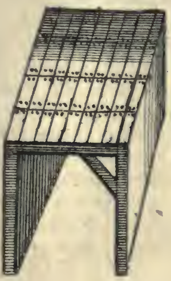


Fig. 2. GALLERY.

J. Jefferys sculp

Sea-GAGE, an inſtrument invented by Dr. Hales and Dr. Deſaguliers, for finding the depth of the ſea, the deſcription whereof is this. A B (plate CIX. fig. 1. nº 1.) is the gage bottle, in which is cemented the gage-tube F*f*, in the braſs-cap at G. The upper end of the tube F, is hermetically ſealed, and the open lower end *f*, is immerſed in mercury, marked C, on which ſwims a ſmall thickneſs or ſurface of treacle. On the top of the bottle is ſcrewed a tube of braſs H G, pierced with ſeveral holes, to admit the water into the bottle A B. The body K, is a weight, hanging by its ſhank L, in a ſocket N, with a notch on one ſide at *m*, in which is fixed the catch *l* of the ſpring S, and paſſing through the hole L, in the ſhank of the weight K, prevents its falling out, when once hung on. On the top, in the upper part of the braſs-tube at H, is fixed a large empty ball, or full-blown bladder I, which muſt not be ſo large, but that the weight K may be able to ſink the whole under water.

The inſtrument, thus conſtructed, is uſed in the following manner. The weight K being hung on, the gage is let fall into deep water, and ſinks to the bottom; the ſocket N, is ſomewhat longer than the ſhank L, and therefore, after the weight K comes to the bottom, the gage will continue to deſcend, till the lower part of the ſocket ſtrikes againſt the weight; this gives liberty to the catch to fly out of the hole L, and let go the weight K; when this is done, the ball or bladder I, inſtantly buoys up the gage to the top of the water. While the gage is under water, the water having free acceſs to the treacle and mercury in the bottle, will by its preſſure force it up into the tube F*f*, and the height to which it has been forced by the greateſt preſſure, *viz.* that at the bottom, will be ſhewn by the mark in the tube which the treacle leaves behind it, and which is the only uſe of the treacle. This ſhews into what ſpace the whole air in the tube F*f* is compreſſed; and conſequently the height or depth of the water, which by its weight produced that compreſſion, which is the thing required.

If the gage-tube F*f*, be of glaſs, a ſcale might be drawn on it with the point of a diamond, ſhewing, by inſpection, what height the water ſtands above the bottom. But the length of 10 inches is not ſufficient for fathoming depths at ſea, ſince that, when all the air in ſuch a length of tube is compreſſed into half an inch, the depth of water is not more than 634 feet, which is not half a quarter of a mile.

If, to remedy this, we make uſe of a tube 50 inches long, which for ſtrength may be a muſquet-barrel, and ſuppoſe the air compreſſed into an hundredth part of half an inch; then by ſaying as 1 : 99 :: 400 : 39600 inches, or 3300 feet; even this is but little more than half a mile, or 2640 feet. But ſince it is reaſonable to ſuppoſe the cavities of the ſea bear ſome proportion to the mountainous parts of the land, ſome of which are more than three miles above the earth's ſurface; therefore, to explore ſuch great depths, the Dr. contrived a new form for his ſea-gage, or rather for the gage-tube in it, as follows: B C D F (*ibid.* nº 2.) is a hollow metalline globe communicating on the top with a long tube A B, whoſe capacity is a ninth part of that globe. On the lower part at D, it has alſo a ſhort tube D E, to ſtand in the mercury and treacle. The air contained in the compound gage-tube is compreſſed by the water, as before; but the degree of compreſſion, or height to which the treacle has been forced, cannot here be ſeen thro' the tube; therefore, to anſwer that end, a ſlender rod of metal or wood, with a knob on the top of the tube A B, will receive the mark of the treacle, and ſhew it, when taken out.

If the tube A B be 50 inches long, and of ſuch a bore that every inch in length ſhould be a cubic inch of air, and the contents of the globe and tube together 500 cubic inches; then, when the air is compreſſed within an hundredth part of the whole, it is evident the treacle will not approach nearer than five inches of the top of the tube, which will agree to the depth of 3300 feet of water as above. Twice this depth will compreſs the air into half that ſpace nearly, *viz.* $2\frac{1}{2}$ inches, which correſpond to 6600 which is a mile and a quarter. Again, half that ſpace, or $1\frac{1}{4}$ inch, will ſhew double the former depth *viz.* 13200 feet, or $2\frac{1}{2}$ miles, which is probably very nearly the greateſt depth of the ſea.

Bucket-ſea-GAGE, an inſtrument contrived by Dr. Hales, to find the different degrees of coolneſs and ſaltneſs of the ſea, at different depths; conſiſting of a common houſhold pail or bucket, with two heads to it. Theſe heads have each a round hole in the middle, near four inches diameter, and covered with valves opening upwards; and that they might both open and ſhut together, there is a ſmall iron-rod fixed to the upper part of the lower valve, and at the other end to the under part of the upper valve; ſo that as the bucket deſcends with its ſinking weight into the ſea, both the valves open by the force of the water, which by that means has a free paſſage through the bucket. But when the bucket is drawn up, then both the valves ſhut by the force of the water at the upper part of the bucket; ſo that the bucket is brought up full of the loweſt ſea-water to which it had deſcended.

When the bucket is drawn up, the mercurial thermometer, fixed in it, is examined; but great care muſt be taken to obſerve the degree at which the mercury ſtands, before the lower part of the thermometer is taken out of the water in the bucket, elſe it would be altered by the different temperature of the air.

In order to keep the bucket in a right poſition, there are four cords fixed to it, reaching about four feet below it, to which the ſinking weight is fixed.

Water-GAGE, or HYDROMETER. See the article HYDROMETER.

GAGES *for grinding optic glaſſes*. See the article GRINDING.

GAGER and GAGING. See the articles GAUGER and GAUGING.

GAIANITES, *gaianitæ*, in church-hiſtory, a branch of eutychians. See the article EUTYCHIANS.

GAIETA, a ſtrong fortified town of the kingdom of Naples, in Italy, thirty five miles north-weſt of the city of Naples: eaſt longitude 14° 30'. and north latitude 41° 20'.

GAIN, in architecture, the bevelling ſhoulder of a joiſt or other timber.

It is alſo uſed for the lapping of the end of the joints, &c. upon a trimmer or girder, and then the thickneſs of the ſhoulder is cut into the trimmer, alſo bevelling upwards, that it may juſt receive the gain, and ſo the joiſt and trimmer lie even and level with the ſurface.

This way of working is uſed in floors and hearths.

GAINAGE, in old law books, properly ſignifies the plough-tackle, or implements of huſbandry; but is alſo uſed for the grain or crop of ploughed lands.

GAINSBOROUGH, a market-town of Lincolnſhire, fourteen miles north-weſt of Lincoln; which gives the title of earl to the noble family of Noel.

GAIOPHRAGMIA, in natural hiſtory, a genus of ſeptariæ, divided by ſepta or partitions of earthy matter, of which there are ſeveral ſpecies. See SEPTARIÆ.

GALACTITES, in natural hiſtory, the name by which the antients called a ſmooth, aſh-coloured, indurated kind of clay, ſaid to have been uſed with ſucceſs for defluxions and ulcers of the eyes, and as an aſtringent. See the article CLAY.

GALANGALS, *galanga*, in the materia medica, the name of two roots kept in the ſhops, a greater and a ſmaller; of which the ſmaller is by far moſt eſteemed.

The leſſer galangal is a ſmall and ſhort root, of an irregular figure, and of the thickneſs of a man's little finger, ſeldom met with more than an inch or two long. It ſhould be choſen full and plump, of a bright colour, very firm and ſound, and of an acrid and inſupportably hot taſte.

The larger galangal is brought to us in pieces of two inches or a little more in length, and of near an inch in thickneſs: its ſurface is leſs unequal and tuberoſe than the ſmaller ſort, but is far from being ſmooth; on the outſide it is of a brown colour, with a very faint caſt of red, and within it is of a paler colour, and has a much leſs acrid and pungent taſte than the ſmaller kind. It is to be choſen in the largeſt, ſoundeſt, and heavieſt pieces.

The roots of both the galangals, but particularly of the leſſer, abound with a volatile, oily, aromatic ſalt; the leſſer is eſteemed an excellent ſtomachic: it has the credit of being a great cephalic, cardiac, and uterine, but is more particularly recommended in vertigos. The greater galangal poſſeſſes the ſame virtues, but in a leſs degree. See the article KÆMPFERIA.

GALANTHUS, the SNOW-DROP, in botany, a genus of the hexandria-monogynia claſs of plants, the flower of which conſiſts of three oblong and obtuſe petals; the fruit is a globoſo-oval capſule, obtuſely trigonal, and containing a great number of roundiſh ſeeds.

The galanthus is the ſame with the narciſſo-leucoium of authors, with a large ſnow-white flower.

GALATA, a great ſuburb belonging to

Conſtantinople, oppoſite to the ſeraglio, on the other ſide of the harbour. It is here that the Greeks, Armenians, Franks, Chriſtians, and Jews inhabit, and are allowed the exerciſe of their reſpective worſhips.

GALATIA, the antient name of Amaſia, a province of Leſſer Aſia.

GALATIANS, or *Epiſtle to the* GALATIANS. See the article EPISTLE.

GALAX, in botany, a genus of the pentandria monogynia claſs of plants, the calyx of which conſiſts of a ten leafed perianthium: the corolla conſiſts of a ſingle bowl faſhioned petal; the fruit is an oval coloured elaſtic capſule, with one cell, containing two large, convex, and callous ſeeds.

GALAXY, in aſtronomy, the via lactea, or milky way in the heavens: a tract of a whitiſh colour, and conſiderable breadth, which runs through a great compaſs of the heavens, ſometimes in a double, but for the greateſt part of its courſe in a ſingle ſtream; and is compoſed of a vaſt number of ſtars, too minute or too remote from the earth, to be diſtinguiſhed by the naked eye; but are diſcovered in all parts of it, in great numbers, by the aſſiſtance of the teleſcope.

GALBANUM, in pharmacy, a gum iſſuing from the ſtem of an umbelliferous plant, growing in Perſia and many parts of Africa.

It is ſometimes met with in the ſhops in looſe granules, called drops or tears, and ſometimes in large maſſes, formed of a number of theſe blended together; but in theſe maſſes ſome accidental foulneſs is often mixed with the gum. The ſingle drops uſually approach to a roundiſh, oblong, pear-like form. Galbanum is ſoft like wax, and, when freſh drawn, white; but it afterwards becomes yellowiſh or reddiſh: it is of a ſtrong ſmell, of an acrid and bitteriſh taſte; it is inflammable in the manner of a reſin, and ſoluble in water like a gum.

It attenuates and diſſolves tough phlegm, and is therefore of ſervice in aſthmas and inveterate coughs: it is alſo of great ſervice in hyſteric complaints; it diſſipates flatulencies, promotes the menſes, and facilitates delivery and the expulſion of the ſecundines. It is given in pills and electuaries, and is uſed externally in form of a plaſter, applied to the belly, againſt habitual hyſteric complaints, and on many other occaſions.

GALE, in the ſea language, a term of various import: when the wind blows not ſo hard but that a ſhip may carry her top-ſails a-trip (that is, hoiſted up to the higheſt) then they ſay it is a loom-gale. When it blows very ſtrong, they ſay it is a ſtiff, ſtrong, or freſh gale. When two ſhips are near one another at ſea, and there being but little wind blowing, one of them finds more of it than the other, they ſay that the one ſhip gales away from the other.

GALEARII, in roman antiquity, ſervants who attended the ſoldiers in the field, and carried their helmets; whence the name.

GALEASSE, a large low-built veſſel, uſing both ſails and oars, and the biggeſt of all the veſſels that make uſe of the latter. It may carry twenty guns, and has a ſtern capable of lodging a great number of marines. It has three maſts, which are never to be lowered or taken down. It has alſo thirty-two benches of rowers and to each bench ſix or ſeven ſlaves, who ſit under cover. This veſſel is at preſent only uſed by the Venetians.

GALEGA, GOAT-RUE, in botany, a genus of the diadelphia-decandria claſs of plants, the calyx of which is a ſhort tubulated, ſingle leafed perianthium, divided into five half ſegments; the corolla is papilionaceous; the fruit is a round, very long pod, containing ſeveral oblong kidney-ſhaped ſeeds.

Goat-rue has been accounted a good ſudorific, but is little uſed in the preſent practice.

GALENIA, in botany, a genus of the octandria-digynia claſs of plants, having no corolla; the calyx is a very ſmall, hollow perianthium, divided into four oblong ſegments; the antheræ are didymous; and the fruit a roundiſh, bilocular capſule, containing two oblong and angulated ſeeds.

GALENIC, or GALENICAL, in pharmacy, a manner of treating diſeaſes founded on the principles of Galen.

The diſtinction of galenical and chemical, was occaſioned by a diviſion of the practitioners of medicine into two ſects, which happened on the introduction of chemiſtry into medicine; then the chemiſts, arrogating to themſelves every kind of merit and ability, ſtirred up an oppoſition to their pretenſions, founded on the invariable adherence of the other party to the antient practice. And though this diviſion into the two ſects of galeniſts and chemiſts has long ceaſed, yet the diſtinction of medicines, which reſulted from it, is ſtill retained.

Galenical medicines are thoſe which are formed by the eaſier preparations of herbs, roots, *&c.* by infuſion, decoction, *&c.* and by combining and multiplying ingredients; while thoſe of chemiſtry, draw their more intimate and remote virtues by means of fire and elaborate preparations, as calcination, digeſtion, fermentation, *&c.*

The late improvements in philoſophy, which have retrieved the reputation of galenical pharmacy, have alſo greatly reformed it. It is now become all mechanical and corpuſcular; and inſtead of qualities and degrees, every thing is now reduced to mechanical affections; to the figures, bulks, gravities, *&c.* of the component particles, and to the great principle of attraction.

GALENISTS, in church-hiſtory, a branch of anabaptiſts, who are ſaid to have adopted ſeveral arian opinions concerning the divinity of our Saviour. See the articles ARIANS and ANABAPTISTS.

GALEOPSIS, HEMP-LEAVED DEAD-NETTLE, in botany, a genus of the didynamia-gymnoſpermia claſs of plants, the flower of which is monopetalous, with the upper lip crenated and arched, and the lower one trifid: the ſeeds are four in number, and contained in the cup.

Both the leaves and ſeeds of this plant are uſed in medicine, and ſaid to be diſcutient and antiſeptic.

GALERITA, in ichthyology, a ſpecies of blennius. See the article BLENNIUS.

The galerita is diſtinguiſhed from the other ſpecies of blennius, by a tranſverſe cutaceous creſt on the head.

GALEUS, in ichthyology, a name by which ſeveral ſpecies of ſharks are called. See the article SHARK.

GALICIA, the moſt north-weſt province of Spain, bounded by the ocean on the north-weſt, by the province of Aſturias and Leon on the eaſt, and by Portugal on the ſouth.

GALICIA, or GUADALAJARA, a province of Mexico, bounded by new Mexico on the north, by the gulph of Mexico on the eaſt, by Mexico proper on the ſouth, and by the Pacific ocean and gulph of California on the weſt.

GALILE, or GALILEE, once a province of Judea, now of Turky in Aſia, was bounded by mount Lebanon on the north, by the river Jordan and the ſea of Galilee on the eaſt, by the river Chiſon on the ſouth, and by the Mediterranean on the weſt. It was the ſcene of many of our Saviour's miracles.

GALILEANS, a ſect of the Jews. Their founder was one Judas, a native of Galilee, from which place they derived their name. Their chief, eſteeming it an indignity for the Jews to pay tribute to ſtrangers, raiſed up his countrymen againſt the edict of the emperor Auguſtus, which had ordered a taxation or enrollment of all the ſubjects of the roman empire.

They pretended that God alone ſhould be owned as maſter and lord; and in other reſpects were of the opinion of the phariſees: but, as they judged it unlawful to pray for infidel princes, they ſeparated themſelves from the reſt of the Jews, and performed their ſacrifices apart.

GALIUM, or GALLIUM, in botany. See the article GALLIUM.

GALL, in the animal œconomy, the ſame with bile. See BILE and BILIOUS.

GALL-BLADDER, called veſicula, and cyſtis fellea, is uſually of the ſhape of a pear, and of the ſize of a ſmall hen's egg. It is ſituated in the concave ſide of the liver, and lies upon the colon, part of which it tinges with its own colour. It is compoſed of four membranes, or coats: the common coat; a veſicular one; a muſcular one, conſiſting of ſtraight, oblique, and tranſverſe fibres; and a nervous one, of a wrinkled or reticulated ſurface within, and furniſhed with an unctuous liquor.

The uſe of the gall-bladder is to collect the bile, firſt ſecreted in the liver, and mixing it with its own peculiar produce to perfect it farther, to retain it together a certain time, and then to expel it.

GALL, in natural hiſtory, denotes any protuberance or tumour produced by the puncture of inſects on plants and trees of different kinds.

Theſe galls are of various forms and ſizes, and no leſs different with regard to their internal ſtructure. Some have only one cavity, and others a number of ſmall cells communicating with each other. Some of them are as hard as the wood of the tree they grow on, whilſt others are ſoft and ſpongy; the firſt being termed gall-nuts, and the latter berry-galls, or apple-galls.

The general hiſtory of galls is this: an inſect of the fly-kind is inſtructed by nature to take care for the ſafety of her young, by lodging her eggs in a woody ſubſtance, where they will be defended from all injuries: ſhe for this purpoſe wounds the branches of a tree; and the lacerated veſſels, diſcharging their contents, ſoon form tumours about the holes thus made. The hole in each of theſe tumours, through which the fly has made its way, may for the moſt part be found; and when it is not, the maggot-inhabitant or its remains are ſure to be found within, on breaking the gall. However, it is to be obſerved, that in thoſe galls which contain ſeveral cells, there may be inſects found in ſome of them, though there be a hole by which the inhabitant of another cell has eſcaped.

Oak-galls put, in a very ſmall quantity, into a ſolution of vitriol in water, though but a very weak one, give it a purple or violet colour; which, as it grows ſtronger, becomes black; and on this property depends the art of making our writing-ink, as alſo a great deal of thoſe of dying and dreſſing leather, and other manufactures.

In medicine, galls are found to be very aſtringent, and good, under proper management, in diarrhœas, dyſenteries, and hæmorrhages of all kinds; they have alſo a very eminent virtue as a febrifuge. Half a dram, or more, of the powder of Aleppo-galls may be given for a doſe, and will often cure an intermittent fever. They are alſo uſed externally by way of fomentation in procidentiæ of the anus: and a decoction of them has been injected in the fluor albus, with very great ſucceſs.

St. GALL, in geography, a town of Switzerland, five miles weſt of the lake of Conſtance; forming a republic of itſelf, but without any territory. Its legiſlative power is lodged in two councils. It is ſaid to contain 10,000 inhabitants, all employed in the linen-manufacture.

GALLANT, or GALANT, a french term adopted into our language, and ſignifying polite, civil, and well bred, with a diſpoſition to pleaſe, particularly the ladies. It alſo ſignifies brave or courageous.

GALLEON, or GALLION, in naval affairs. See the article GALLION.

GALLERY, in architecture, a covered place in a houſe, much longer than broad, and uſually in the wings of a building; its uſe being chiefly to walk in.

GALLERY, in fortification, a covered walk acroſs the ditch of a town, made of ſtrong beams, covered over head with planks, and loaded with earth: ſometimes it is covered with raw hides to defend it from the artificial fires of the beſieged. Its ſides ſhould be muſquet-proof. It ought to be eight foot high, and ten or twelve wide, and the covering to riſe with a ridge, that what is thrown upon it by the beſiegers with a deſign to burn it, may roll off. See plate CIX. fig. 2.

Galleries are chiefly uſed to ſecure and facilitate the miners approach to the face of the baſtion, over the moat, which is already ſuppoſed to be filled up with faggots and bavins, and the artillery of the oppoſite flank diſmounted.

GALLERY *of a mine*, is a narrow paſſage, or branch of a mine carried on underground to a work deſigned to be blown up.

Both the beſiegers and the beſieged alſo, carry on galleries in ſearch of each others mines, and theſe ſometimes meet and deſtroy each other.

GALLERY, in a ſhip, that beautiful frame, which is made in the form of a balcony, at the ſtern of a ſhip without board; into which there is a paſſage out of the admiral's or captain's cabbin, and is for the ornament of the ſhip.

GALLERY, in gardening, a kind of covered walk, in a garden, formed into porticoes or arches, with horn beams, lime-trees, or the like.

Each pillar of the porticoes or arches ought to be four feet diſtant from the other, and the gallery twelve feet high, and ten feet wide, that there may be room for two or three perſons to walk a-breaſt.

In forming theſe galleries, it is to be obſerved, that when the horn-beams are grown to the height of three feet, and the diſtance of the pillars well regulated; the next thing to be done is, to form the frontiſpiece: to perform which, the horn-beam muſt be run up a trellace made for that purpoſe, which forms the arch, and as it grows up, thoſe bows which outſhoot the others, muſt be cut with the ſheers, and in time they will grow ſtrong, and may be kept in form by the ſheers.

Whiſpering GALLERY. See WHISPERING.

GALLEY, in naval affairs, a low-built veſſel, uſing both ſails and oars, and commonly carrying only a main-maſt and fore-maſt, which may be ſtruck or lowered at pleaſure. Such veſſels are much uſed in the Mediterranean, eſpecially by the king of France. See **Ship.**

Condemnation to the **Galleys**, the puniſhment of being compelled to ſerve on board theſe veſſels, impoſed on certain criminals in France; and that either for life, or for a limited number of years, according to the nature of their crimes.

Galley, or **Gally**, in printing. See the article **Gally.**

GALLI, in antiquity, the prieſts of the goddeſs Cybele, who were eunuchs, and took their name from Gallus, a river in Phrygia.

When a youth was to be initiated into this order, the cuſtom was to throw off his cloaths, to run crying aloud into the midſt of the troop, and then drawing a ſword to caſtrate himſelf; after this, he ran about the ſtreets, carrying in his hands the marks of his mutilation, which he was to throw into a houſe, and in that houſe to put on a woman's dreſs.

GALLIAMBIC verse, *Galliambus*, in antient poetry, a verſe conſiſting of ſix feet, *viz.* an anapeſt, or a ſpondee; an iambus, or an anapeſt, or a tribrach; an iambus; a dactyl; a dactyl; an anapeſt. The word Galliambus, is a compound of iambus and gallus, a prieſt of Cybele. Theſe prieſts carried about the image of that goddeſs, in order to get alms, and as a part of their employment was ſinging verſes all over the country, they, by this means, rendered poetry very deſpicable.

GALLIARD, a gay, ſprightly, whimſical kind of dance, formerly much uſed, conſiſting of very different motions and actions, ſometimes running ſmoothly along, then capering, ſometimes along the room, and ſometimes acroſs.

This dance was brought from Rome; from whence it was alſo called romaneſque.

GALLIARDA, the name of a tune that belongs to a dance called a galliard.

It is commonly in triple time, of a briſk and lively humour, and ſomething like a jig.

GALLICAN, any thing belonging to France: thus the term gallican church denotes the church of France, or the aſſembly of the clergy of that kingdom. See the article **Church.**

Gallican breviary, the breviary uſed by the church of Agregentum in Sicily: probably ſo called from its being introduced by St. Gerlan, who was made biſhop of Agregentum after the Saracens were driven out of Sicily by earl Roger; and by the other french biſhops, brought thither by norman princes.

GALLICISM, a mode of ſpeech peculiar to the french language, and contrary to the rules of grammar in other languages.

GALLINÆ, in ornithology, an order of birds, the beak of which is conic, and ſomewhat incurvated, and the upper chap imbricated.

Under this order are comprehended the oſtrich, peacock, pheaſant, wood-cock, turkey, the common dunghill cock, partridge, &c. See the articles **Ostrich, Peacock,** &c.

GALLINACEOUS, an appellation given to the birds of the order of the gallinæ. See the article **Gallinæ.**

GALLINAGINIS caput, in anatomy. See **Caput Gallinaginis.**

GALLINAGO, in ornithology, a bird called in engliſh the ſnipe. See **Snipe.**

GALLING, or **Excoriation**, in medicine. See **Excoriation.**

Galling *of a horſe's back*, a diſorder occaſioned by heat, and the chafing or pinching of the ſaddle.

In order to prevent it, ſome take a hind's ſkin well garniſhed with hair, and fit it neatly under the pannel of the ſaddle, ſo that the hairy ſide may be next the horſe.

When a horſe's back is galled upon a journey, take out a little of the ſtuffing of the pannel over the ſwelling, and ſew a piece of ſoft white leather on the inſide of the pannel; anoint the part with ſalt butter, and every evening wipe it clean, rubbing it till it grow ſoft, anointing it again with butter, or for want of that, with greaſe: waſh the ſwelling, or hurt, every evening with cold water and ſoap, and ſtrew it with ſalt, which ſhould be left on till the horſe be ſaddled in the morning.

GALLION, or **Galleon**, in naval affairs, a ſort of ſhips employed in the commerce of the Weſt-Indies. The Spaniards ſend annually two fleets; the one for Mexico, which they call the flota, and the other for Peru, which they call the gallions. See the article **Flota.**

By a general regulation made in Spain, it has been eſtabliſhed, that there ſhould be twelve men of war, and five tenders, annually fitted out for the armada or galleons; eight ſhips of ſix hundred tons burden each, and three tenders, one of an hundred tons, for the iſland Margarita, and two of eighty each, to follow the armada: for the New Spain fleet, two ſhips of ſix hundred tons each, and two tenders of eighty each; and for the Honduras fleet, two ſhips of five hundred tons each: and, in caſe no fleet happened to ſail any year, three gallions and a tender ſhould be ſent to New Spain for the plate.

They are appointed to ſail from Cadiz, in January, that they may arrive at Porto-Bello about the middle of April, where the fair being over, they may take aboard the plate, and be at Havanna with it about the middle of June, where they are joined by the flota, that they may return to Spain with the greater ſafety.

GALLIOT, a ſmall gally deſigned only for chace, carrying only one maſt, and two or three pattereroes; it can both ſail and row, and has ſixteen or twenty oars. All the ſeamen on board are ſoldiers, and each has a muſket by him on quitting his oar.

GALLIPAGO-ISLANDS, are ſituated in the Pacific Ocean on both ſides the equator, between 85° and 90°, weſt longitude, and about four hundred miles weſt of Peru.

GALLIPOLI, a port-town of european Turky, ſituated at the entrance of the Propontis, or Sea of Marmora, about 100 miles ſouth weſt of Conſtantinople: eaſt long. 28°, and north lat. 40° 45.

Gallipoli is alſo a port-town of the kingdom of Naples, ſituated on the gulph of Otranto, about twenty-three miles weſt of that city: eaſt long. 19°, and north lat. 40° 25′.

GALLIUM, LADIES-BEDSTRAW, in botany, a genus of the tetrandria-monogynia claſs of plants, the flower of which is a quadrifid ſingle petal, without any tube, and placed flatwiſe: the fruit conſiſts of two globoſe bodies, growing cloſe together, but not adhering, and containing each a ſingle kidney-ſhaped ſeed. It is ſaid to be an excellent aſtringent.

GALLO, an iſland on the Pacific Ocean near the coaſt of Peru, about 200 miles weſt of Popayan: weſt longitude 80°, and north latitude 2° 15′.

Gallo is alſo a town of Italy, ten miles ſouth of Ancona.

Gallo, or **Punto gallo**, a ſea-port of Ceylon, ſubject to the Dutch: eaſt long. 78°, and north lat. 6°.

GALLON, a meaſure of capacity both for dry and liquid things, containing four quarts; but theſe quarts, and conſequently the gallon itſelf, are different, according to the quality of the thing meaſured: for inſtance, the wine gallon contains 231 cubic inches, and holds eight pounds averdupois of pure water: the beer and ale gallons contain 282 ſolid inches, and holds ten pounds three ounces and a quarter averdupois, of water: and the gallon for corn, meal, *&c.* 272½ cubic inches, and holds nine pounds thirteen ounces of pure water.

GALLOON, in commerce, a narrow thick kind of ferret, or lace, uſed to edge or border cloaths, ſometimes made of wool, and at other times of gold or ſilver.

GALLOP, in the manege, a motion of a horſe that runs at full ſpeed, in which making a kind of leap forwards, he lifts both his fore legs almoſt at the ſame time; when theſe are in the air, juſt upon the point of touching the ground, he lifts both his hind-legs almoſt at once.

A horſe in galloping forwards, may lead with which fore-leg he pleaſes, tho' horſes do it moſt commonly with their right fore-leg; but with whatever fore-leg they lead, the hind-leg of the ſame ſide muſt follow it, otherwiſe their legs are ſaid to be diſunited. To remedy this diſorder, the rider muſt ſtay the horſe a little upon the hand, and give him the ſpur on the contrary ſide to that in which he is diſunited.

In a circle, a horſe is always to lead with the fore leg, within the turn; otherwiſe he is ſaid to gallop falſe; but here too, the hind-leg of the ſame ſide muſt follow.

GALLOPADE, in the manege, alſo termed the fine gallopade, the ſhort gallop, the liſtening gallop, and the gallop of the ſchool, is a hand-gallop, in which a horſe galloping upon one or two treads, is well united, well knit together, and well coupled. Hence it is ſaid, that a horſe makes a gallopade, and works with one haunch; that is, inſtead of going upon one tread, whether right-out, or in a circle, he has one haunch kept in ſubjection, let the turn or change of the hand be what it will; ſo that the inner haunch, which looks to the center of the ground is more narrowed, and comes nearer to the center than the ſhoulder; and thus the horſe does not go altogether to that ſide, and his way of working is a little more than one tread, and ſomewhat leſs than two.

GALLOWAY, a province of Scotland, which gives the title of earl to a branch of the noble family of Stuart.

It is divided into two diſtricts; the weſtern, called Upper Galloway, being the ſame with Wigtonſhire; and the eaſtern, or ſtewarty of Kirkcudbright, called Lower Galloway.

GALLOWAY is alſo the capital of a county of the ſame name, in the province of Connaught, in Ireland: weſt long. 9° 12′, and north lat. 53° 12′.

It has a good port and is advantageouſly ſituated for a foreign trade.

New-GALLOWAY, a borough town of Scotland, in the county of Wigton, with which, and ſome other boroughs, it claſſes.

GALLOWS, an inſtrument of puniſhment, on which perſons convicted of felony, *&c.* are executed by hanging. It is formed of two pieces of timber fixed in the earth, with a beam faſtened to each on the top; or with three pieces of timber fixed in the earth, with three pieces on the top, forming a triangle.

GALLOWS *of a plough*, a part of the plough-head, ſo called by farmers, from its reſemblance to the common gallows, as conſiſting of three pieces of timber, whereof one is placed tranſverſely over the heads of the other two. See the article PLOUGH.

GALLS in natural hiſtory. See GALL.

Harneſs-GALLS, among farriers. See the article HARNESS.

GALLUS, the COCK, in ornithology, a well known domeſtic fowl, the head of which in ornamented with a longitudinal fleſhy cruſt, or comb: the wattles are two, and placed longitudinally on the throat. This, in its natural ſtate, is a very robuſt and beautiful bird, variegated with a great number of elegant colours. See plate CX. fig. 1. where n° 1. repreſents the common dunghill-cock, and n° 2. the hen.

GALLY, in printing, a frame into which the compoſitor empties the lines out of his compoſing-ſtick, and in which he ties up the page when it is completed.

The gally is formed of an oblong ſquare board, with a ledge on three ſides, and a grove to admit a falſe-bottom, called a gally-ſlice.

GALLY, in the ſea-language, is a place in the cook-room, where the grates are ſet up, and in which fires are made for roaſting or boiling the victuals.

GALLY-WORM, in zoology, the engliſh name of the julus of authors. See the article JULUS.

GAMBEZON, or GAMBA, in antiquity, a kind of ſoft quilted waiſtcoat, worn under the coat of mail to prevent its hurting the body. It was made of wool or cotton, quilted between two ſtuffs, and was alſo called counterpoint.

GAMBIA a great river of Africa, which, running from eaſt to weſt falls into the Atlantic ocean in 14° north lat. and 15° weſt long.

It is ſaid to be navigable for ſloops 600 miles. About ten leagues up this river is James's Iſland, a ſettlement belonging to Great Britain: it is very ſmall, being leſs than a mile in circumference, but is defended by a fort.

GAMBOGE is a concreted vegetable juice, the produce of two trees, both called by the Indians caracápulli, and is partly of a gummy, and partly of a reſinous nature. It is brought to us either in form of orbicular maſſes, or of cylindrical rolls of various ſizes; and is of a denſe, compact, and firm texture, and of a beautiful yellow. It is chiefly brought to us from Cambaja, in the Eaſt-Indies, called alſo Cambodja, and Cambogia; and from thence it has obtained its names of cambadium, cambogium, and gambogium.

It is a very rough and ſtrong purge; it operates both by vomit and ſtool, and both ways with much violence, almoſt in the inſtant in which it is ſwallowed; but yet without griping. It requires caution and judgment in adminiſtring it; but thoſe who know how to give it properly, find it an excellent remedy in dropſies, cachexies, jaundice, aſthmas, catarrhs, and in the worſt cutaneous eruptions. Its doſe is from two or three grains to ſix, eight or ten: four grains generally operate briſkly without vomiting, and eight or ten grains uſually vomit briſkly, and afterwards purge downwards.

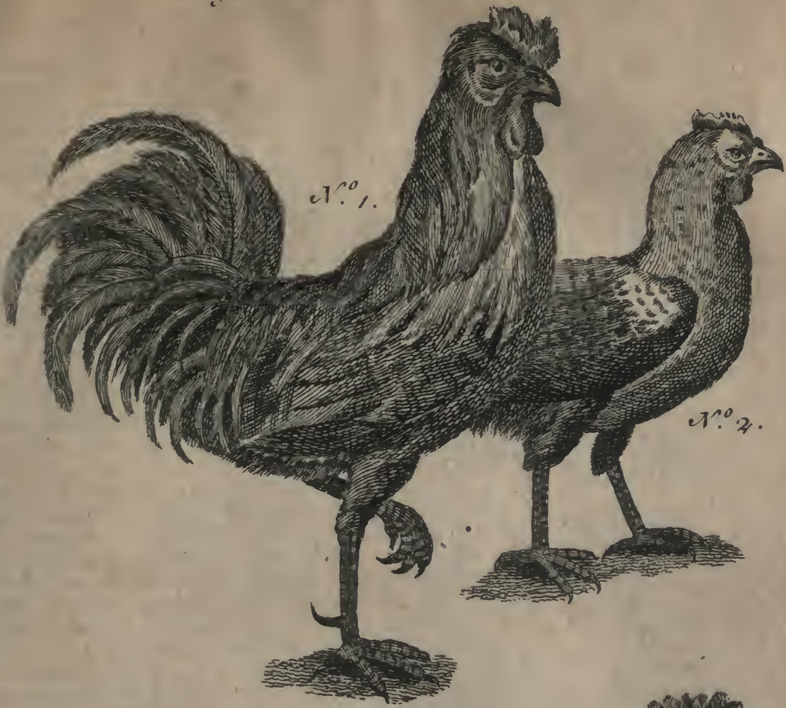
It is at preſent much more eſteemed by painters in water colours, than by phyſicians.

GAME, *ludus*, in general, ſignifies any diverſion, or ſport, that is performed with regularity, and reſtrained to certain rules. See the article GAMING.

Games are uſually diſtinguiſhed into thoſe of exerciſe and addreſs, and thoſe of hazard. To the firſt belong cheſs, tennis, billiards, wreſtling, *&c.* and to the latter thoſe performed with cards or dice, as back-gammon, ombre, picquet, whiſt, *&c.* See the articles CHESS, BACK-GAMMON, *&c.*

GAMES, *ludi*, in antiquity, were public

Fig. 1. GALLUS & GALLINA



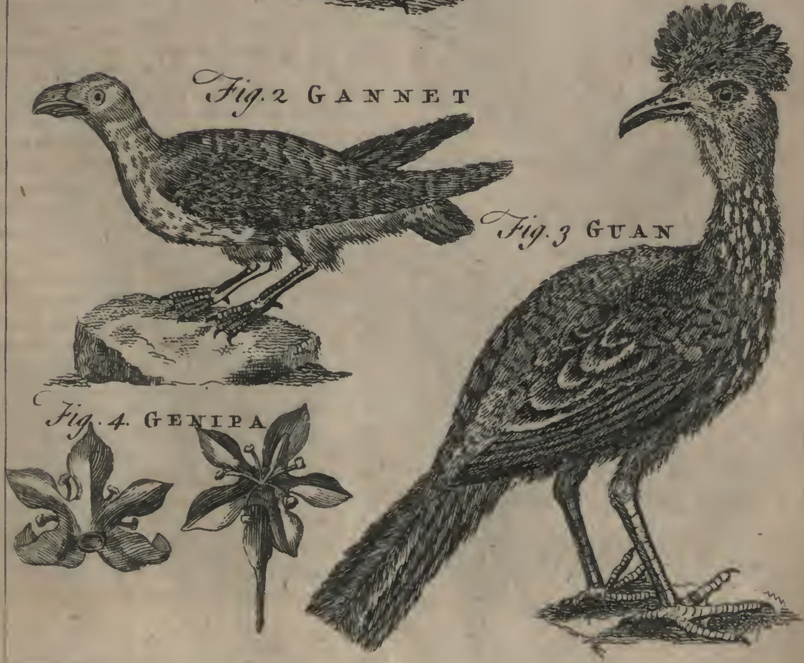


Fig. 2 GANNET

Fig. 3 GUAN

Fig. 4. GENIPA

J. Jeffrys sculp

diverſions, exhibited on ſolemn occaſions. Such, among the Greeks, were the olympic, pythian, iſthmian, nemæan, &c. games; and, among the Romans, the apollinarian, circenſian, capitoline, &c. games. See the articles OLYMPIC, PYTHIAN, &c.

It was alſo cuſtomary, among the Greeks, for perſons of quality to inſtitute games, with all ſorts of exerciſes, as running, wreſtling, boxing, &c. at the funerals of their friends, to do them honour, and render their death more remarkable. This practice is frequently mentioned by antient writers, as Miltiades's funeral in Herodotus, Braſidas's in Thucydides, Timoleon's in Plutarch, with many more. Nor was this cuſtom peculiar to later ages, ſince we find the deſcription of Patroclus's funeral games takes up the greateſt part of one of Homer's iliads; and even prior to this, Oedipus's funeral is ſaid to have been ſolemnized with ſports.

Among the Romans, there were three ſorts of games, *viz.* ſacred, honorary, and ludicrous. The firſt were inſtituted immediately in honour of ſome deity or hero; of which kind were thoſe already mentioned, together with the auguſtales, florales, palatini, &c. The ſecond claſs were thoſe exhibited by private perſons, at their own expence, in order to pleaſe the people, and ingratiate themſelves with them, to make way for their own preferment: ſuch were the combats of gladiators, the ſcenic games, and other amphitheatrical ſports. The ludicrous games were much of the ſame nature with the games of exerciſe and hazard among us: ſuch were the ludus trojanus, teſſeræ, tali, trochus, &c. See the article TROJAN GAME, &c.

By a decree of the roman ſenate, it was enacted, that the public games ſhould be conſecrated, and united with the worſhip of the gods as a part thereof; whence it appears, that feaſts, ſacrifices, and games, made up the greateſt part, or rather the whole, of the external worſhip offered by the Romans to their deities.

Others diſtinguiſh the roman games into 1. The equeſtrian, or curule games, which were the ſame with the circenſian. 2. The gymnic games, wherein were exhibited gladiatorial, and other ſhews of the like nature: theſe were ſacred to Mars and Minerva. 3. The theatrical entertainments, conſiſting of tragedies, comedies, balls, &c. theſe were ſacred to Apollo, Bacchus, Minerva, Venus, &c.

GAME, in law, ſignifies birds or prey, taken or killed by fowling, or hunting. There are ſeveral ſtatutes for puniſhing offences committed by perſons not qualified by law, to take or deſtroy the game. The antient laws ordain, that no perſon ſhall take pheaſants or partridges, with engines in another's ground, without his licence, on forfeiture of 10l. and perſons killing any pheaſant, partridge, pigeon, duck, hare, or other game, forfeit 20s. for every fowl, hare, &c. 11 Hen. VII. 1 Jac. I. c. 17. Conſtables having a juſtice of peace's warrant, may ſearch the houſes of ſuſpected perſons for game; and in caſe any be there found, and they do not give a good account how they came by it, ſuch perſon ſhall forfeit for each hare or pheaſant, partridge, &c. not under 5s. nor exceeding 20s. Likewiſe by another ſtatute, if any higler, chapman, carrier, inn-keeper, or victualler, ſhall have in his cuſtody any hares, pheaſants, partridges, heath-game, &c. he forfeits for every hare and fowl, 5l. unleſs the ſame be ſent by a perſon qualified to kill game. The ſelling or offering game to ſale is made liable to the like penalty; and in that caſe, if any hare, &c. be found in a ſhop, &c. it is deemed expoſing it to ſale. Perſons not qualified, keeping dogs, nets, or engines to kill game, on their conviction before a juſtice of peace, ſhall alſo pay 5l. or be ſent to the houſe of correction for three months, 4 and 5 W. and M. c. 23. 5 Ann. c. 14. 9 Ann. The penalties for deſtroying game, are recoverable by action, as well as before juſtices of peace, by 8 Geo. I. c. 19. If a perſon hunts any game on the land of another, ſuch other cannot juſtify the killing of his dogs. Where one in hunting ſtarts a hare upon his own land, and then follows and kills ſuch hare in another perſon's ground, it is lawful, and the game is his own; but where a man ſtarts a hare on another's land, and kills it there, he is ſubject to an action of treſpaſs.

GAME-COCK, a fighting cock, or one kept for ſport; in the choice of which, four things are chiefly to be regarded, *viz.* ſhape, colour, courage, and ſharp heel.

1. As to ſhape, a game-cock muſt not be choſen either too large, or too ſmall:

the firſt being generally unwieldy, and unactive; the other weak and tedious in fighting. The middle-ſized cock is therefore moſt proper for this purpoſe, as being ſtrong, nimble, and eaſily matched; his head ought to be ſmall, with a quick large eye and a ſtrong beak, which ſhould be crooked, and in colour ſuitable to the plume of his feathers; the beam of his leg ſhould be ſtrong, and of the colour of his plume; his ſpurs ſhould be rough, long and ſharp; a little bending, and pointing inward. 2. The beſt colour for a game-cock is either that of a grey, yellow, or red: the pyed pile may paſs indifferently; but the white and dun are rarely known to be good for any thing. If his neck be inveſted with a ſcarlet complexion, it is a ſign of his being ſtrong, luſty and courageous: whereas a pale and wan complexion denotes him faint and unhealthy. 3. His courage may be known by his proud, upright ſtanding, and ſtately tread in walking; and if he crows frequently in the pen, it is a proof of ſpirit. 4. His ſharpneſs of heel is known only from obſervation in fighting; that is, when at every riſing he hits ſo that he draws blood from his adverſary; gilding his ſpurs continually, and at every blow threatening him with immediate death.

To prepare a cock to fight; 1. With a pair of fine ſhears, cut all his mane off, cloſe to his neck, from the head to the ſetting of the ſhoulders. 2. Clip off all the feathers from the tail cloſe to his rump, and the redder it appears, the better is the cock in condition. 3. Spread his wings by the length of the firſt riſing feather; and cut off the reſt ſlope-wiſe, with ſharp points, that in his riſing he may therewith endanger an eye of his adverſary. 4. Scrape, ſmooth and ſharpen his ſpurs with a pen knife: and, laſtly, ſee that there be no feathers on the crown of his head, for his opponent to take hold of; and moiſten his head all over with your ſpittle.

GAME-HEN, ſhould be of a black, brown, ſpeckled grey, grizzle, or yellow colour: being tufted on the crown denotes courage and reſolution; and having the addition of weapons, conduces very much to her excellency. Her body ſhould be big and well poked behind, for the production of large eggs. A general remark is, that a right hen of the game, from a dung-hill cock, will bring forth very good chickens; but the beſt game cock from a dunghil hen, will never get a bird fit for the game.

GAME-KEEPERS, are thoſe who have the care of keeping and preſerving the game, and are appointed to that office by lords of manors, *&c.* who not being under the degree of eſquire, may, by a writing under their hands and ſeals, authorize one or more game-keepers, who may ſeize guns, dogs or nets uſed by unqualified perſons for deſtroying the game. Game-keepers are alſo to be perſons either qualified by law to kill the game, or to be truly and properly the ſervants of the lords or ladies of manors appointing them; and no game-keeper can qualify any perſon to ſuch end, or to keep dogs, *&c.* 5 Ann. c. 14. 9 Ann. c. 25. 3 Geo. I. c. 11.

The perſons qualified to keep guns, dogs, *&c.* are thoſe who have a free warren, 100l. a year by inheritance, or for life, or a leaſe for ninety-nine years of 150l. per annum, alſo the eldeſt ſons of eſquires, *&c.* 22 and 23 Car. II. c. 25.

A lord of a manor may appoint a game-keeper within his manor and royalty to kill hares, pheaſants, partridges, *&c.* for his own uſe, the name of whom is to be entered with the clerk of the peace of the county; and if any other game-keeper, or one legally authorized, under colour of his authority, kills game, and afterwards ſells it, without the conſent of the perſon that impowers him, he is on conviction to ſuffer corporal puniſhment.

GAMELIA, *γαμηλια*, in grecian antiquity, a nuptial feaſt, or rather ſacrifice, held in the antient greek families on the day before a marriage; thus called, from a cuſtom they had of ſhaving themſelves on this occaſion, and preſenting their hair to ſome deity to whom they had particular obligations.

GAMELION, a poem, or compoſition in verſe on the ſubject of a marriage, commonly called an epithalamium. See the article EPITHALAMIUM.

GAMELION, in antient chronology, was the eighth month of the Athenian year, containing twenty-nine days, and anſwering to the latter part of our January, and beginning of February. It was thus called, as being, in the opinion of the Athenians, the moſt proper ſeaſon of the year for marriage.

GAMING, the art of playing or practiſing any game, particularly thoſe of hazard, as cards, dice, tables, *&c.*

Gaming has, at all times, been looked on as a thing of pernicious conſequence to the common-wealth; and is, therefore, ſeverely prohibited by law. The ſtatute 33 Hen. VIII. gives juſtices of peace, and head officers in corporations, a power to enter all houſes ſuſpected of unlawful games; and to arreſt the gameſters, till they give ſecurity not to play for the future. Perſons keeping any unlawful gaming-houſe, are fined 40 s. and the gameſters 6 s. 8 d. a time. If any perſons by fraud, deceit, or unlawful device, in playing either at cards or dice, tables, bowls, cock-fighting, horſe-races, foot-races, *&c.* or bearing a ſhare in the ſtakes, or betting, ſhall win any money or valuable thing of another, he ſhall forfeit treble the value thereof: likewiſe if any perſon ſhall play at any of the ſaid games upon tick, and not for ready money, and loſe the ſum of 100 l. on credit, at any one meeting, if the money be not paid down, his ſecurity taken for it ſhall be void, and the winner becomes liable to a forfeiture of treble value of ſuch money won. 16 Car. II. c. 7. Not only all notes, bills, bonds, mortgages, or other ſecurities given for money won at gaming, are declared void; but alſo where lands are granted, they ſhall go to the next perſon intitled, after the deceaſe of the perſon ſo incumbering the ſame: perſons loſing by gaming at one time 10 l. may recover the money loſt, from the winner, by an action of debt brought within three months; and on the loſer's not proſecuting, any other perſon may lawfully do it, and recover treble the value with coſts. 9 Ann. c. 14. Thoſe who cheat at cards, dice, *&c.* beſides their forfeitures, have inflicted on them ſuch infamy and corporal puniſhment, as in caſes of perjury; and perſons beating or challenging any other perſon to fight, on account of money won by gaming, ſhall forfeit all their goods, and be impriſoned two years: and where perſons play that have no viſible eſtates, and do not make it appear that the principal part of their maintenance is got by other means than gaming, they may be bound to their good behaviour by two juſtices of the peace, *&c.* Stat. *ibid.* See 2 Geo. II. c. 28. The ace of hearts, pharaoh, baſſet, and hazard, are judged to be lotteries by cards or dice; and perſons who ſet up thoſe games, are ſubject to 200 l. penalty. And every adventurer, who ſhall play, ſtake, or punt at them, forfeits 50 l. Alſo any ſales of houſes, goods, plate, *&c.* in ſuch a way, are void, and the things forfeited to any who will ſue for the ſame. 12 Geo. II. c. 28.

Laws of GAMING. Theſe are founded on the doctrine of chances. See the article CHANCE.

Mr. de Moivre, in a treatiſe de Menſura Sortis, has computed the variety of chances in ſeveral caſes that occur in gaming, the laws of which may be underſtood by what follows.

Suppoſe p the number of caſes in which an event may happen, and q the number of caſes wherein it may not happen, both ſides have the degree of probability, which is to each other as p to q.

If two gameſters, A and B, engage on this footing, that, if the caſes p happen, A ſhall win; but, if q happen, B ſhall win, and the ſtake be a; the chance of A will be $\frac{pa}{p+q}$, and that of B $\frac{qa}{p+q}$; conſequently, if they ſell the expectancies, they ſhould have that for them reſpectively.

If A and B play with a ſingle die, on this condition, that, if A throw two or more aces at eight throws, he ſhall win; otherwiſe B ſhall win; what is the ratio of their chances? Since there is but one caſe wherein an ace may turn up, and five wherein it may not, let $a=1$, and $b=5$. And again, ſince there are eight throws of the die, let $n=8$; and you will have $\overline{a+b}^{\,n}-b^n-nab^n-1$, to b^n+nab^n-1: that is, the chance of A will be to that of B, as 663991 to 1015625, or nearly as 2 to 3.

A and B are engaged at ſingle quoits, and, after playing ſome time, A wants 4 of being up, and B 6; but B is ſo much the better gameſter, that his chance againſt A upon a ſingle throw would be as 3 to 2; what is the ratio of their chances? Since A wants 4, and B 6, the game will be ended at nine throws; therefore, raiſe $a+b$ to the ninth power, and it will be $a^9+9a^8b+36a^7bb+84a^6b^3+126a^5b^4+126a^4b^5$, to $84a^3b^6+36aab^7+6ab^3+b^9$: call a 3, and b 2, and you will have the ratio of chances in numbers, *viz.* 1759077 to 194048.

A and B play at ſingle quoits, and A is the beſt gameſter, ſo that he can give B 2 in 3, what is the ratio of their chances at a ſingle throw? Suppoſe the chances as z to 1, and raiſe $z+1$ to its cube, which will be z^3+3z^2+3z+1. Now ſince A could give B 2 out of 3; A might undertake to win three throws running; and, conſequently, the chances in this caſe will be as z^3 to $3z^2+3z+1$. Hence $z^3=3z^2+3z+1$; or, $2z^3=z^3+3z^2+3z+1$. And, therefore, $z\sqrt{2}=z+1$; and, conſequently, $z=\frac{1}{\sqrt[3]{2}-1}$. The chances, therefore, are $\frac{1}{\sqrt[3]{2}-1}$, and 1, reſpectively.

Again, ſuppoſe I have two wagers depending, in the firſt of which I have 3 to 2 the beſt of the lay, and in the ſecond 7 to 4, what is the probability I win both wagers?

1. The probability of winning the firſt is $\frac{3}{5}$, that is the number of chances I have to win, divided by the number of all the chances: the probability of winning the ſecond is $\frac{7}{11}$: therefore, multiplying theſe two fractions together, the product will be $\frac{21}{55}$, which is the probability of winning both wagers. Now, this fraction being ſubtracted from 1, the remainder is $\frac{34}{55}$, which is the probability I do not win both wagers: therefore the odds againſt me are 34 to 21.

2. If I would know what the probability is of winning the firſt, and loſing the ſecond, I argue thus: the probability of winning the firſt is $\frac{3}{5}$, the probability of loſing the ſecond is $\frac{4}{11}$: therefore multiplying $\frac{3}{5}$ by $\frac{4}{11}$, the product $\frac{12}{55}$ will be the probability of my winning the firſt, and loſing the ſecond; which being ſubtracted from 1, there will remain $\frac{43}{55}$, which is the probability I do not win the firſt, and at the ſame time loſe the ſecond.

3. If I would know what the probability is of winning the ſecond, and at the ſame time loſing the firſt, I ſay thus: the probability of winning the ſecond is $\frac{7}{11}$; the probability of loſing the firſt is $\frac{2}{5}$: therefore, multiplying theſe two fractions together, the product $\frac{14}{55}$ is the probability I win the ſecond, and alſo loſe the firſt.

4. If I would know what the probability is of loſing both wagers, I ſay, the probability of loſing the firſt is $\frac{2}{5}$, and the probability of loſing the ſecond $\frac{4}{11}$: therefore, the probability of loſing them both is $\frac{8}{55}$; which being ſubtracted from 1, there remains $\frac{47}{55}$: therefore, the odds of loſing both wagers is 47 to 8.

This way of reaſoning is applicable to the happening or failing of any events that may fall under conſideration. Thus if I would know what the probability is of miſſing an ace four times together with a die, this I conſider as the failing of four different events. Now the probability of miſſing the firſt is $\frac{5}{6}$, the ſecond is alſo $\frac{5}{6}$, the third $\frac{5}{6}$, and the fourth $\frac{5}{6}$; therefore the probability of miſſing it four times together is $\frac{5}{6}\times\frac{5}{6}\times\frac{5}{6}\times\frac{5}{6}=\frac{625}{1296}$; which being ſubtracted from 1, there will remain $\frac{671}{1296}$ for the probability of throwing it once or oftener in four times: therefore the odds of throwing an ace in four times, is 671 to 625.

But if the flinging of an ace was undertaken in three times, the probability of miſſing it three times would be $\frac{5}{6}\times\frac{5}{6}\times\frac{5}{6}=\frac{125}{216}$; which being ſubtracted from 1, there will remain $\frac{91}{216}$ for the probability of throwing it once or oftener in three times: therefore the odds againſt throwing it in three times are 125 to 91.

Again, ſuppoſe we would know the probability of throwing an ace once in four times, and no more: ſince the probability of throwing it the firſt time is $\frac{1}{6}$, and of miſſing it the other three times is $\frac{5}{6}\times\frac{5}{6}\times\frac{5}{6}$, it follows that the probability of throwing it the firſt time, and miſſing it the other three ſucceſſive times, is $\frac{1}{6}\times\frac{5}{6}\times\frac{5}{6}\times\frac{5}{6}=\frac{125}{1296}$; but becauſe it is poſſible to hit it every throw as well as the firſt, it follows, that the probability of throwing it once in four throws, and miſſing the other three, is $\frac{4\times125}{1296}=\frac{500}{1296}$; which being ſubtracted from 1, there will remain $\frac{796}{1296}$ for the probability of throwing it once, and no more, in four times. Therefore, if one undertake to throw an ace once, and no more, in four times, he has 500 to 796 the worſt of the lay, or 5 to 8 very near.

Suppoſe two events are ſuch, that one of them has twice as many chances to come up as the other, what is the probability that the event, which has the greater number of chances to come up, does not happen twice before the other happens once, which is the caſe of flinging 7 with two dice before 4 once? Since the number of chances are as 2 to 1, the probability of the firſt happening before the ſecond is $\frac{2}{3}$, but the probability of its happening twice before it, is but $\frac{2}{3}\times\frac{2}{3}$ or $\frac{4}{9}$: therefore it is 5 to 4 ſeven does not come up twice before four once.

But, if it were demanded, what muſt be the proportion of the facilities of the coming up of two events, to make that which has the moſt chances come up twice, before the other comes up once? The anſwer is 12 to 5 very nearly; whence it follows, that the probability of throwing the firſt before the ſecond is $\frac{12}{17}$, and the probability of throwing it twice is $\frac{12}{17}\times\frac{12}{17}$, or $\frac{144}{289}$; therefore, the probability of not doing it is $\frac{145}{289}$: therefore the odds againſt it are as 145 to 144, which comes very near an equality.

Suppoſe there is a heap of thirteen cards of one colour, and another heap of thirteen cards of another colour, what is the probability that, taking one card at a venture out of each heap, I ſhall take out the two aces?

The probability of taking the ace out of the firſt heap is $\frac{1}{13}$, the probability of taking the ace out of the ſecond heap is $\frac{1}{13}$; therefore the probability of taking out both aces is $\frac{1}{13}\times\frac{1}{13}=\frac{1}{169}$, which being ſubtracted from 1, there will remain $\frac{168}{169}$: therefore the odds againſt me are 168 to 1.

In caſes where the events depend on one another the manner of arguing is ſomewhat altered. Thus, ſuppoſe that out of one ſingle heap of thirteen cards of one colour I ſhould undertake to take out firſt the ace; and, ſecondly, the two: though the probability of taking out the ace be $\frac{1}{13}$, and the probability of taking out the two be likewiſe $\frac{1}{13}$; yet the ace being ſuppoſed as taken out already, there will remain only twelve cards in the heap, which will make the probability of taking out the two to be $\frac{1}{12}$; therefore the probability of taking out the ace, and then the two, will be $\frac{1}{13}\times\frac{1}{12}$.

In this laſt queſtion the two events have a dependence on each other, which conſiſts in this, that one of the events being ſuppoſed as having happened, the probability of the other's happening is thereby altered. But the caſe is not ſo in the two heaps of cards.

If the events in queſtion be n in number, and be ſuch as have the ſame number a of chances by which they may happen, and likewiſe the ſame number b of chances by which they may fail, raiſe $a+b$ to the power n. And if A and B play together, on condition that if either one or more of the events in queſtion happen, A ſhall win, and B loſe, the probability of A's winning will be $\frac{\overline{a+b}|^n - b^n}{\overline{a+b}|^n}$; and that of B's winning will be $\frac{b^n}{\overline{a+b}|^n}$; for when $a+b$ is actually raiſed to the power n, the only term in which a does not occur is the laſt $b\,n$: therefore, all the terms but the laſt are favourable to A.

Thus if $n=3$, raiſing $a+b$ to the cube $a^3+3a^2b+3ab^2+b^3$, all the terms but b^3 will be favourable to A; and therefore the probability of A's winning will be $\frac{a^3+3a^2b+3ab^2}{\overline{a+b}|^3}$, or $\frac{\overline{a+b}|^3 - b^3}{\overline{a+b}|^3}$; and the probability of B's winning will be $\frac{b^3}{\overline{a+b}|^3}$. But if A and B play on condition, that if either two or more of the events in queſtion happen, A ſhall win; but in caſe one only happen, or none, B ſhall win; the probability of A's winning will be $\frac{\overline{a+b}|^n - nab^{n-1} - b^n}{\overline{n+b}|^n}$; for the only two terms in which $a\,a$ does not occur, are the two laſt, *viz.* nab^{n-1} and b^n.

GAMMONING, among ſeamen, denotes ſeveral turns of rope taken round the bowſprit, and reeved through holes in knees of the head, for the greater ſecurity of the bowſprit.

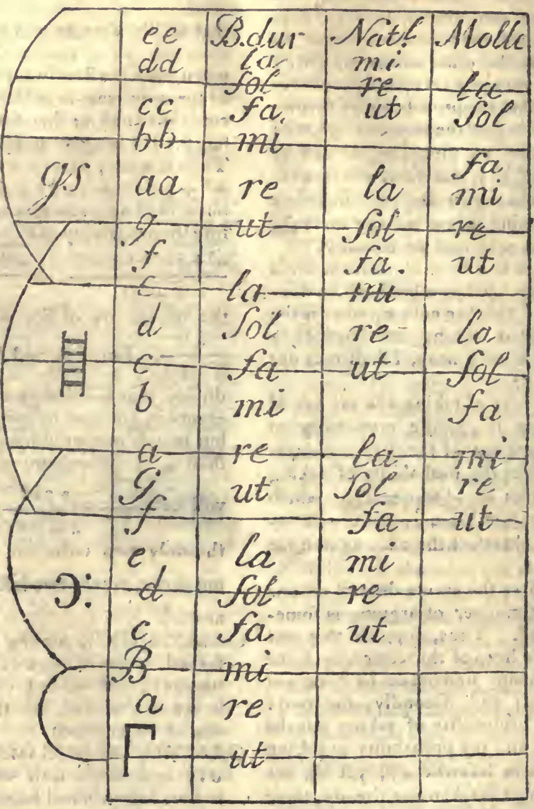
GAMMUT, GAM, GAMMA, or GAMMAUT, in muſic, a ſcale whereon we learn to ſound the muſical notes, *ut*, *re*, *mi*, *fa*, *ſol*, *la*, in their ſeveral orders and diſpoſitions. See NOTE and SCALE.

The invention of this ſcale is owing to Guido Aretine; tho' it is not ſo properly an invention as an improvement on the diagram, or ſcale of the Grecians. See the article DIAGRAM.

The gammut is alſo called the harmonical hand, by reaſon that Guido made firſt uſe of the figure of the hand to demonſtrate the progreſſion of his ſounds.

Guido, finding the diagram of the antients of too ſmall an extent, added five more chords or notes to it; one below the proſlambanomenos of the antients, and four above the nete hyperbolæon. The firſt he called hypo-proſlambanomenos, and denoted it by the letter G, or the greek Γ, gamma; which note being at the head of the ſcale, occaſioned the whole ſcale to be called by the name of gam, or gammut. This ſcale is divided into three ſeries or columns, the firſt called durum, the ſecond natural, and the third molle, as repreſented by the following ſcheme.

The GAMUT or SCALE of GUIDO.



The uſe of this ſcale is to make the paſſages and tranſitions from B molle to B durum, by means of tones and ſemitones. The ſeries of B natural ſtanding between the other two, communicates with both, ſo that to name the chord of the ſcale by theſe ſyllables, if we would have the ſemitones in their natural places, *viz. b, c,* and *e, f,* then we apply *ut* to *g*; and after *la* we go into the ſeries of B natural, at *fa*; and after the *la* of this, we return to the former at *mi*; and ſo on. And we may begin at *ut* in *c*, and paſs into the firſt ſeries, at *mi*, and then back to the other at *fa*, by which means the one tranſition is a ſemitone, *viz. la, fa*, and the other a tone, *la, mi*. To follow the order of B molle, we may begin with *ut* in *c* or *f*, and make each ſemitone after the ſame manner.

Hence came the barbarous names of gamut, are, Bmi, &c. but what perplexed work is here with ſo many different ſyllables applied to each chord, and all to mark the places of the ſemitones, which the ſimple letters *a, b, c*, &c. do as well, and with more eaſe.

Several alterations have been made in the gammut. M. le Murs particularly added a ſeventh ſyllable, *viz. ſi*; and the Engliſh uſually throw out that and *ut*, and make the other ſerve for all, as will be ſhewn under the article SOLFAING.

GAMMUT, or GAMM, is alſo the firſt or

graveſt note in the modern ſcale of muſic, the reaſon whereof is ſhewn under the preceding article.

GANDER, in ornithology, the male of the gooſe-kind; one of which, it is ſaid, will ſerve five geeſe. See GOOSE.

GANG, in the ſea-language, the ſame with crew. See the article CREW.

The company wherewith a ſhip's boat is manned, is called the cockſwain's crew, or gang. See the article COCK-SWAIN.

GANG-WAY is the ſeveral paſſages or ways from one part of the ſhip to the other; and whatever is laid in any of thoſe paſſages, is ſaid to lie in the gang-way.

GANG-FISH, a ſpecies of coregonus, with the upper jaw longeſt and flat, and with fourteen rays in the back fin. See the article COREGONUS.

GANGEA, the capital of a territory in the province of Chirvan, in Perſia: eaſt long. 46°, north lat. 41°.

GANGES, a large river of the hither India, riſes in the mountains which ſeparate India from Tartary; and, running from the north-weſt to the ſouth-eaſt near 1500 miles through the Mogul's dominions, diſcharges itſelf by ſeveral channels into the bay of Bengal.

This river is worſhiped like a god by the ſuperſtitious Indians, many thouſands of whom annually undertake pilgrimages to it, and carry their dying friends to expire on its banks, and as ſoon as they die, heave them into the middle of it.

GANGI, or COULER, a town of Golconda, in the hither India: eaſt long. 79°, and north lat. 16°.

GANGLIO, or GANGLION, in ſurgery, a hard tubercle, generally moveable, in the external or internal part of the carpus, upon the tendons or ligaments in that part, uſually without any pain to the patient. Though ganglions ſo nearly reſemble an encyſted tumour, that Celſus makes them one and the ſame; yet their difference may appear, if it were only from their different ſeats; ganglions being confined to the tendons and ligaments of the hands and feet, whereas encyſted tumours are not reſtrained to any part of the body. See the article ENCYSTED.

With regard to the cauſe of ganglions, they ſeem generally to proceed from an inſpiſſation of the viſcid juices, which are let out, and lodged betwixt the fibres and membranes, when the tendons and ligaments of theſe parts have been injured by a fall, blow, ſtrain, contuſion, or the like, in which caſe they gradually increaſe more or leſs, as long as the fibres yield; the juices find vent ſo as to advance to the ſize of a filbert, walnut, or even a pigeon's egg: ſome are oblong, round, or oval, with an equal or uneven ſurface: ſome of them which are recent, may be eaſily diſperſed; and others, which have been of long ſtanding, hardly yield to any remedies but the knife.

The inſpiſſated matter of a recent ganglion, may often be happily diſperſed by barely rubbing the tumour well every morning with the faſting ſaliva, and binding a plate of lead on it afterwards for ſeveral weeks ſucceſſively. Many attribute a greater diſcutient virtue to the lead, when it has firſt had ſome mercury rubbed on it. Foreſtus, and others, adviſe the uſe of a plaſter of ammoniac and mercury, and often to rub them with oil of ſapo. Others write, that a cure may be readily performed, if the patient lays his hand upon a table, and ſtrikes on the tumour with his fiſt: but care ſhould be taken not to injure the bones, tendons, or other parts of the hand in ſtriking the tumour; and the ſame care muſt be taken if there is a neceſſity of having recourſe to cauſtics or inciſion, in order to remove them.

GANGRENE, a very great and dangerous degree of inflammation, wherein the parts affected begin to corrupt, and put on a ſtate of putrefaction. A gangrene is diſtinguiſhed from a ſphacelus, in as much as this latter is not an incipient but an abſolute and perfect corruption, or death of the parts, already made. See the article SPHACELUS.

A gangrene may be diſcovered generally from the following ſigns; namely, the inflammation, with its ſymptoms, which have all along been very violent, do generally undergo a ſudden change, as if they were going off. The parts which were before ſwelled and tenſe, do now grow ſoft and flaccid, and upon preſſing with the finger on the ſkin and fat, its impreſſion remains behind, as in an œdema; at length the cuticula ſeparates from the cutis, often riſing up in bliſters, like thoſe on burns, filled with a reddiſh, yellowiſh, and black humour; and the ſenſe of the limb is in ſome degree diminiſhed. See the article OEDEMA.

The cauſe of a gangrene, as well as a ſphacelus, are either external or internal. Among the internal cauſes are reckoned an eryſipelas, and all other inflammations which riſe ſpontaneouſly, and can by no means be diſperſed, nor brought to ſuppuration. Inflammations of this kind uſually proceed from the blood's being too acrimonious, or corrupted by the bile, or in a ſcorbutus; or when the circulation of the blood is too quick, or too ſlow, by reaſon of old age, or any other weakneſs; or, laſtly, when the patient uſes a perverſe courſe of life with reſpect to diet, and paſſions of the mind, eſpecially anger, grief, and fear, during the time of the inflammation. By external cauſes are intended injuries of the air, cold water, and the application of topical remedies externally to the inflamed parts; which are either cooling, aſtringent, fat, oily, or the like; together with all great external hurts or accidents, which frequently happen to the body through falls, blows, &c. as in wounds, fractures, luxations, &c. See WOUND, FRACTURE, and LUXATION.

A gangrene is for the generality never without danger, becauſe it eaſily changes into a ſphacelus, or intire mortification, which never admits of cure but by taking off the dead parts. But a gangrene which is ſlight, incipient, and not ſpread far, but only affects the ſkin and fat, is not very difficult to cure; eſpecially when it happens in a young and ſtout patient, in a mild and temperate ſeaſon, and does little or no injury to the muſcles and nerves: but the larger, more violent, and confirmed is the gangrene, and the faſter it ſpreads, the more difficult it is generally to effect a cure, eſpecially in an old or weak patient; or in an ill habit of body, from a dropſy, phthiſis, or ſcorbutus: the weather alſo being too hot, or very cold, or the parts affected being near the thorax, or abdomen, may make the caſe more dangerous. Nor can this caſe be neglected without the utmoſt danger of life, or its ſuddenly turning into a ſphacelus.

Therefore the gangrene muſt be treated ſo, that it may not terminate in a ſphacelus. For which end, firſt of all, in plethoric and ſtrong habits, the patient muſt be bled largely, and the operation repeated at diſcretion; but in weak habits, it ſhould be omitted. The remainder of the treatment, according to Heiſter, will conſiſt chiefly in obſerving the following directions. 1. To be careful in the beginning to prevent all violent external cauſes of inflammations, too ſtrict a bandage in wounds and fractures, all foreign bodies which are ſtuck in the part, as thorns, ſplinters, &c. improper medicines externally applied, as ointments, oils, and plaſters, with cooling and aſtringent things; all which ſhould be removed as ſoon as poſſible. 2. The next obſervation reſpects chiefly the keeping up the patient's ſtrength, eſpecially in weak and old people. This may be beſt effected by ordering a diet which not only affords good juices, but is alſo well accommodated to the age, conſtitution, and other circumſtances of the patient. In weak and old people, the moſt ſuitable diet will be ſoops, ſtrengthening broths, &c. With reſpect to medicines, the moſt proper are the corroborants, uſually termed cordials, as the ſpirits, eſſences, powders, and electuaries of that tribe; eſpecially made up or mixed with confected alkermes. It will be proper alſo, in this caſe, frequently to apply a ſponge to the noſe or carpal arteries, which has been dipped in hungary water; alſo to bind it to the temples. For patients who are of a more warm, ſanguine, and bilious habit, ſoops and ptiſans mixed with acid juice of citrons or lemons, will be very proper ſtrengtheners; at the ſame time, not neglecting other medicines, which are proper to be uſed in fevers: but the peruvian bark is by many celebrated in this diſorder beyond any other internal medicine. 3. The chief and laſt obſervation concerning the treatment of a gangrene, is chiefly to diſcharge the ſtagnating and corrupted blood from the parts affected as ſoon as poſſible, to prevent the neighbouring parts from being affected thereby.

The principal means to effect this are, 1. To make uſe of proper internal, ſtrengthening medicines. 2. To make ſcarifications on the part affected, by numerous inciſions lengthways, and of a ſufficient depth, in order to diſcharge the ſtagnating and corrupted blood, and to make way for the ingreſs of the virtues of the diſcutient medicines which are applied externally. Laſtly, 3. Diſcutient, ſtimulating, and balſamic fomentations and cataplaſms which reſiſt putrefaction, are to be carefully applied to the diſordered part. See FOMENTATION and CATAPLASM.

The fomentation is to be applied hot, ſeveral times in a day, to the parts affected, by means of linen or woollen cloths; and to give a laſting warmth, we may apply a hot tile wrapped up in a thick cloth, or a hot bag of ſand.

GANNET, in ornithology, a bird of the larus or gull-kind, frequent on the weſtern coaſts of England.

It is equal in ſize to the common duck. The upper part of the body is of a deep ruſty ferrugineous colour, much like that of the common buzzard; and the breaſt and belly are alſo brown, but paler. It is an extremely ſingular ſpecies, its whole aſpect, in ſome degree, approaching to that of ſome of the larger birds of prey. See plate CX. fig. 2.

GANTLET, or **GAUNTLET**, a large kind of glove, made of iron, and the fingers covered with ſmall plates. It was formerly worn by cavaliers, when armed at all points.

GANTLET, in ſurgery, a kind of bandage for the hand. See BANDAGE.

It conſiſts of a ſwathe four or five yards long, with which they wrap up the hand, and all the fingers, one after another.

GAOL, a priſon or place of legal confinement.

Every county has two gaols, one for debtors, which may be wherever the ſheriff pleaſes; the other for the peace and matters of the crown, which is the county gaol.

If a gaol be out of repair, or inſufficient, &c. juſtices of peace, in their quarter ſeſſions, may contract with workmen for the rebuilding or repairing it; and by their warrant order the ſum agreed on for that purpoſe, to be levied on the ſeveral hundreds and other diviſions in the county by a juſt rate, 11 & 12 Will. III. c. 19. See the article PRISON.

GAOL-DELIVERY, is where a commiſſion or patent is granted by the king in the nature of a letter, to certain perſons, who are thereby appointed his juſtices, or to two or three of them, authoriſing them to deliver his gaol, at ſuch a place, of the priſoners contained therein; and for that end it commands them to meet at ſuch place, at the time they themſelves ſhall appoint, when the ſheriff of the county is commanded to bring all the priſoners in the gaol before them, &c. 4 *Inſt.* 168.

The juſtices of gaol-delivery are impowered by the common law to proceed upon indictments of felony, treſpaſs, &c. and to order execution or reprieve; they may likewiſe diſcharge ſuch priſoners, as on their trials are acquitted, and thoſe againſt whom, on proclamation made, no evidence has appeared: they have authority to try offenders for treaſon, and to puniſh many particular offences by ſtatute 2 Hawk. 24. 2 Hale's hiſt. Placit. Cor. 35.

GAOL *Fever*, the ſame with that termed hoſpital-fever. See the article HOSPITAL-FEVER.

GAOLER, the keeper of a gaol or priſon. Sheriffs are to make ſuch gaolers for whom they will be anſwerable: but if there be any default in the gaoler, an action lies againſt him for an eſcape, &c. yet the ſheriff is moſt uſually charged. 2 *Inſt.* 592. Where a gaoler kills a priſoner by hard uſage, it is felony. 3 *Inſt.* 52. No fee ſhall be taken by gaolers, but what is allowed by law, and ſettled by the judges, who may determine petitions againſt their extortions, &c. 2 Geo. II. c. 22.

GAP, a city and biſhop's ſee of Dauphine, in France, eighteen miles weſt of Embrun: eaſt longitude 5° 46′, north latitude 44° 32′.

GARBE, in heraldry, a ſheaf of any kind of grain, borne in ſeveral coats of arms, and ſaid to repreſent ſummer, as a bunch of grapes does autumn.

GARBLER *of ſpices*, an antient officer in the city of London, who is authorized to enter into ſhops, ware-houſes, &c. there to view and ſearch drugs, ſpices, &c. and ſee that they be garbled or cleanſed from the droſs and duſt wherewith they are mixed.

GARBLING *of bow-ſtaves*, the ſorting them, or ſeparating the good from the bad.

GARBOARD-STRAKE, the plank next the keel of a ſhip, one edge of which is run into the rabbit made in the upper edge of the keel on each ſide.

GARCINIA, in botany, a genus of the icoſandria-monogynia claſs of plants, called magoſtans by Garcias, from whom Linnæus has given it the name of garcinia.

The flower conſiſts of four roundiſh, patent petals; and the fruit is a large unilocular, coriaceous berry, containing eight hairy and fleſhy ſeeds, convex on one ſide, and angular on the other.

GARDA, a town of the Veroneſe, in Italy ſubject to Venice: eaſt long. 11°, north lat. 45° 25′.

GARDANT, or **GUARDANT**, in heraldry, denotes any beaſt full faced, and looking right forward. See plate CXI. fig. 4. which repreſents a lion gardant.

GARDELEBEN, a town of Brandenburg, in Germany: eaſt long. 11° 45′, north lat. 52° 40′.

GARDEN, a plot of ground, cultivated and properly ornamented with a variety of plants, flowers, fruit, *&c.*

Gardens are uſually diſtinguiſhed into flower-garden, fruit-garden, and kitchen-garden; the firſt of which, being deſigned for pleaſure and ornament, is to be placed in the moſt conſpicuous part, that is, next to the back front of the houſe; and the two latter, being deſigned for uſe, ſhould be placed leſs in ſight. But tho' the fruit and kitchen-gardens are here mentioned as two diſtinct gardens, yet they are now uſually in one; and that with good reaſon, ſince they both require a good ſoil and expoſure, and equally require to be placed out of the view of the houſe. See KITCHEN-GARDEN.

In the choice of a place proper for a garden, the moſt eſſential points to be conſidered are the ſituation, the ſoil, the expoſure, water and proſpect.

1ſt, As to the ſituation, it ought to be ſuch a one as is wholeſome, and in a place neither too high nor too low; for if a garden be too high, it will be expoſed to the winds, which are very prejudicial to trees; and if it be too low, the dampneſs, the vermin, and the venomous creatures that breed in ponds and marſhy places, add much to their inſalubrity. The moſt happy ſituation is on the ſide of a hill, eſpecially if the ſlope be eaſy, and in a manner imperceptible; if a good deal of level ground be near the houſe; and if it abounds with ſprings of water; for, being ſheltered from the fury of the winds, and the violent heat of the ſun, a temperate air will be there enjoyed; and the water that deſcends from the top of the hill, either from ſprings or rain, will not only ſupply fountains, canals, and caſcades for ornament, but when it has performed its office, will water the adjacent valleys, and, if it be not ſuffered to ſtagnate, will render them fertile and wholeſome. Indeed if the declivity of the hill be too ſteep, and the water be too abundant, a garden on the ſide of it may frequently ſuffer, by having trees torn up by torrents and floods; and by the tumbling down of the earth above, the walls may be demoliſhed, and the walks ſpoiled. It cannot, however, be denied, that the ſituation on a plain or flat, has ſeveral advantages which the higher ſituation has not: for floods and rain commit no damage; there is a continued proſpect of champaigns, interſected by rivers, ponds and brooks, meadows and hills covered with woods or buildings; beſides, the level ſurface is leſs tireſome to walk on, and leſs chargeable, than that on the ſide of an hill, ſince terrace walks and ſteps are not there neceſſary: but the greateſt diſadvantage of flat gardens, is the want of thoſe extenſive proſpects which riſing grounds afford.

2dly, A good earth, or ſoil, is next to be conſidered; for it is ſcarce poſſible to make a fine garden in a bad ſoil; there are indeed ways to meliorate ground, but they are very expenſive; and ſometimes when the expence has been beſtowed of laying good earth three feet deep over the whole ſurface, a whole garden has been ruined, when the roots of the trees have come to reach the natural bottom. To judge of the quality of the ſoil, obſerve whether there be any heath, thiſtles, or ſuch-like weeds growing ſpontaneouſly in it; for they are certain ſigns that the ground is poor. Or if there be large trees growing thereabouts, obſerve whether they grow crooked, ill-ſhaped, and grubby, and whether they are of a faded green, and full of moſs, or infeſted with vermin; if this be the caſe, the place is to be rejected: but, on the contrary, if it be covered with good graſs fit for paſture, you may then be encouraged to try the depth of the ſoil. To know this, dig holes in ſeveral places, ſix feet wide, and four feet deep; and if you find three feet of good earth it will do very well; but leſs than two, will not be ſufficient. The quality of good ground is neither to be ſtony, nor too hard to work; neither too dry, too moiſt, nor too ſandy and light; nor too ſtrong and clayey, which is the worſt of all for gardens.

3dly, The next requiſite is water, the want of which is one of the greateſt inconveniencies that can attend a garden, and will bring a certain mortality upon whatever is planted in it, eſpecially in the greater droughts that often happen in a hot and dry ſituation in ſummer; beſides its uſefulneſs in fine gardens for making fountains, canals, caſcades, *&c.* which are the greateſt ornaments of a garden.

4thly, The laſt thing to be conſidered, is the proſpect of a fine country; and tho' this is not ſo abſolutely neceſſary as water, yet it is one of the moſt agreeable beauties of a fine garden: beſides, if a garden be planted in a low place that has no kind of proſpect, it will not only be diſagreeable, but unwholeſome.

In the laying out and planting of gardens the beauties of nature ſhould always be ſtudied; for the nearer a garden approaches to nature, the longer it will pleaſe. The area of a handſome garden, may take up thirty or forty acres, but not more; and the following rules ſhould be obſerved in the diſpoſition of it. There ought always to be a deſcent of at leaſt three ſteps from the houſe to the garden; this will render the houſe more dry and wholeſome, and the proſpect on entering the garden more extenſive. The firſt thing that ſhould preſent itſelf to view, ſhould be an open lawn of graſs, which ought to be conſiderably broader than the front of the building; and if the depth be one half more than the width, it will have a better effect: if on the ſides of the lawn there are trees planted irregularly, by way of open groves, the regularity of the lawn will be broken, and the whole rendered more like nature. For the convenience of walking in damp weather, this lawn ſhould be ſurrounded with a gravel walk, on the outſide of which ſhould be borders three or four feet wide, for flowers: and from the back of theſe the proſpect will be agreeably terminated by a ſlope of ever green ſhrubs, which, however, ſhould never be ſuffered to exclude agreeable proſpects, or the view of handſome buildings. Theſe walks may lead thro' the different plantations, gently winding about in an eaſy natural manner, which will be more agreeable than either thoſe long ſtraight walks, too frequently ſeen in gardens, or thoſe ſerpentine windings, that are twiſted about into ſo many ſhort turns, as to render it difficult to walk in them: and as no garden can be pleaſing where there is a want of ſhade and ſhelter, theſe walks ſhould lead as ſoon as poſſible into plantations, where perſons may walk in private, and be ſheltered from the wind. Where the borders of the gardens are fenced with walls or pales, they ſhould be concealed with plantations of flowering-ſhrubs intermixed with laurels, and other ever-greens, which will have a good effect, and at the ſame time conceal the fences, which are diſagreeable, when left naked and expoſed to the ſight. Groves are the moſt agreeable parts of a garden, ſo that there cannot be too many of them; only that they muſt not be too near the houſe, nor be ſuffered to block up agreeable proſpects. To accompany parterres, groves opened in compartments, quincunxes, and arbour-work with fountains, *&c.* are very agreeable. Some groves of ever-greens ſhould be planted in proper places, and ſome ſquares of trees of this kind may alſo be planted among the other wood. See QUINCUNX, *&c.*

Narrow rivulets, if they have a conſtant ſtream, and are judiciouſly led about a garden have a better effect than many of the large ſtagnating ponds or canals, ſo frequently made in large gardens. When wilderneſſes are intended, they ſhould not be cut into ſtars and other ridiculous figures, nor formed into mazes or labyrinths, which in a great deſign appear trifling. Buildings, ſtatues, and vaſes, appear very beautiful; but they ſhould never be placed too near each other: magnificent fountains are alſo very ornamental; but they ought never to be introduced, except there be water to keep them conſtantly running. The ſame may alſo be obſerved of caſcades and other falls of water. See the articles CASCADE, FOUNTAIN, *&c.*

In ſhort, the ſeveral parts of a garden ſhould be diverſified; but in places where the eye takes in the whole at once, the two ſides ſhould be always the ſame. In the buſineſs of deſigns, the aim ſhould be always at what is natural, great and noble. The general diſpoſition of a garden, and of its parts, ought to be accommodated to the different ſituations of the ground, to humour its inequalities, to proportion the number and ſorts of trees and ſhrubs to each part, and to ſhut out from the view of the garden no objects that may become ornamental. And before a garden is planned out, it ought ever to be conſidered, what it will be when the trees have had twenty years growth.

GARDENING, a branch of agriculture, containing the cultivation of gardens. See the preceding article.

The art of gardening affords a variety of delights. It teaches how to diſpoſe fruit-trees, flowers, and herbs to the beſt advantage, whether for profit or pleaſure; and ſhews how to prepare the ſoil for ſowing the different kinds of ſeeds, as well as how to treat the plants when grown up. It is a pleaſure to behold a perſon employed, among the plants of a ſpacious

cious garden, in reforming, by proper methods, a growth of natural wildings; to ſee him cultivate mutual alliances between his plants, by grafting or inoculation, whereby the bad are meliorated, and the good rendered ſtill more perfect. By this means, a plant taken from the wilds of a foreſt, ſoftens its ſavage nature, and will ſometimes diveſt itſelf of its thorns, when it happens to be aſſociated with a domeſtic one.

As to the ſeveral parts and operations of gardening, the reader will find them deſcribed under the articles SOWING, PLANTING, TRANSPLANTING, GRAFTING, INOCULATION, PRUNING, NURSERY, HOT-BED, GREEN-HOUSE, WALK, TERRACE, ALLEY, AVENUE, ARBOUR, GROVE, ESPALIERS, STANDARDS, &c.

GARDENING *a hawk*, in falconry, the putting her on a turf of graſs to cheer her.

GARGANEY, in ornithology, a bird of the anas or duck-kind, about the ſize of the common teel, which in many particulars it greatly reſembles. It is diſtinguiſhed by a green ſpot in the wings, and a white line over the eyes. See ANAS.

GARGARISM, in medicine, is ſometimes taken, in a large ſenſe, for every collution of the mouth; but ſtrictly ſpeaking, it ſignifies a liquid medicine, appropriated to affections of the mouth, gums, fauces, larynx, and ſometimes of the head, received into the mouth, and there uſed by way of collution, without deglutition.

Gargarizations, according to Celſus, are made for the ſake of alleviation, repreſſion, or evacuation. The firſt intention is anſwered by milk and cremor of ptiſan, or bran; repreſſion is effected by water wherein lentiles, roſes, brambles, quinces or dates have been bottled; and evacuant gargariſms are muſtard and pepper.

GARIDELLA, FENNEL-LEAVED NIGELLA, in botany, a genus of the decandria-trigynia claſs of plants. It has no flower petals; but there are five long, equal, and bilabiated nectaria: the fruit conſiſts of three oblong, compreſſed, acuminated capſules, formed of two valves, and containing numerous ſmall ſeeds.

GARLAND, a ſort of chaplet made of flowers, feathers, and ſometimes precious ſtones, worn on the head, in manner of a crown.

GARLAND alſo denotes ornaments of flowers, fruits, and leaves, intermixed, antiently much uſed at the gates of temples, where feaſts and ſolemn rejoicings were held; or at any other place where marks of public joy or gaiety were required, as at triumphal arches, tournaments, &c.

The flowers and greens whereof garlands were compoſed, were various. The antients made no public entertainment but upon the feſtivals of the gods; and then the garlands, hymns and ſongs, were that part of the entertainment the gods were ſuppoſed to delight in, according to Athenæus. And in later ages of antiquity, upon the public feſtival of any god, they uſed that particular herb or flower ſuppoſed to be ſacred to that deity: but, at other times, all ſuch herbs were made uſe of as the ſeaſon would beſt admit of, or as they thought were moſt conducive to pleaſure, health, or refreſhment. Garlands were not confined to the head only, but other parts of the body, particularly the breaſt, were adorned with them.

GARLIC, *allium*, in botany, a genus of the hexandria-monogynia claſs of plants; the corolla whereof conſiſts of ſix, oblong, concave, erect petals; the fruit is a very ſhort, broad capſule, of a trilobated figure, conſiſting of three valves, and containing three cells; the ſeeds are numerous, and of a roundiſh figure.

This genus comprehends the common garlic, the yellow moly, the onion, the leek, and the long onion.

The ſeveral ſpecies of this genus agree in medicinal virtues with the cepa, or onion. See the article CEPA.

GARNET, *granatus*, in natural hiſtory, a very beautiful gem, of a red colour, with an admixture of bluiſh.

When pure and free from blemiſhes, it is little inferior, in appearance, to the oriental ruby, tho' only of a middle degree of hardneſs between the ſaphire and common cryſtal. It is found of various ſizes, from that of a pin's head to an inch in diameter.

Among our lapidaries and jewellers, genuine garnets are known by different names, according to their different degrees of colour. 1. The garnet, ſimply ſo called, is the fineſt and moſt valuable kind, being of a very deep blood-red, with a faint admixture of blue. 2. The rock-ruby, a name very improperly given to the garnet, when it is of a very ſtrong but not deep red, and has a fairer caſt of the blue; this is a very beautiful gem. 3. The ſorane or ſerain garnet, that of a yet brighter red, approaching to the colour of native cinnabar, with a faint blue tinge. 4. The almandine, a garnet only a little paler than that called the rock-ruby.

Garnets are very properly diſtinguiſhed into the oriental and occidental kinds, as being found in Europe as well as the Eaſt Indies. The oriental ones are principally brought from Calicut, Cananor, and Cambay; and the european ones are common in Italy, Hungary, and Bohemia. Some authors have ſuppoſed the deeper-coloured garnet to be the ſame with the carbuncle of the antients, from which it really differs; ſince, on receiving the ſun's beams, it never gives ſo true a fire-colour as the carbuncle. See the article CARBUNCLE.

Counterfeit **GARNET**, or **GARNET-PASTE**, a preparation of glaſs, the colour of which emulates that of the genuine garnet. See the article GLASS.

This paſte is made three different ways. 1. By mixing two ounces of prepared cryſtal with ſix of common red-lead, and adding ſixteen grains of manganeſe, and three grains of zaffer. 2. By adding $5\frac{1}{2}$ ounces of minium to two of cryſtal, and then mixing with them fifteen grains of manganeſe, and four grains of zaffer. 3. By mixing five ounces of minium with two ounces of prepared cryſtal, and adding fifty-two grains of manganeſe, and ſix grains of zaffer. This laſt makes by far the moſt elegant garnet-paſte.

GARNET, in a ſhip, is a tackle having a pendant coming down from the main-maſt, with a block well ſeized to the main ſtay, juſt over the hatch-way, to which a guy is fixed to keep it ſteady; and at the other end is a long tackle-block, in which the fall is reeved, that ſo by it any goods or caſks may be hauled and hoiſted into or out of the ſhip. When this garnet is not uſed, it is faſtened along the ſtay.

Clew **GARNET**, in a ſhip. See CLEW.

GARNISH, in law-books, ſignifies to warn; in which ſenſe, to garniſh the heir, is mentioned in ſtat. 27 Eliz. c. 3. See the article GARNISHMENT.

GARNIHSEE, is uſed for the third perſon or party in whoſe hands money is attached within the liberties of the city of London, in the ſheriff's court there; and he is ſo called, becauſe he has had garniſhment or warning not to pay the money, but to appear and anſwer to the plaintiff creditor's ſuit.

GARNISHMENT, is a warning given to a perſon for his appearance, for the better furniſhing of the cauſe and court; as where a perſon is ſued for detaining charters or other writings delivered him by the plaintiff, and another perſon, upon ſome certain conditions; and therefore he prays that the other perſon may be warned to plead with the plaintiff, whether the conditions are or are not performed; which is the praying of garniſhment; and interpreted to be either a warning of that other, or a furniſhing the court with parties ſufficient to determine the cauſe.

GARONNE, a large river of France, which taking its riſe in the Pyrenean mountains, runs north-weſt by the city of Tholouſe, divides the provinces of Guienne and Gaſcony, and viſiting the city of Bourdeaux, falls into the bay of Biſcay, about ſixty miles below that city. It has alſo a communication with the Mediterranean, by means of the royal canal of Lewis XIV.

The tide flows up this river twenty miles above Bourdeaux.

GARRISON, in the art of war, a body of forces, diſpoſed in a fortreſs, to defend it againſt the enemy, or to keep the inhabitants in ſubjection; or even to be ſubſiſted during the winter-ſeaſon: hence, garriſon and winter-quarters are ſometimes uſed indifferently, for the ſame thing; and ſometimes they denote different things. In the latter caſe a garriſon is a place wherein forces are maintained to ſecure it; and where they keep regular guard, as a frontier town, a citadel, caſtle, tower, &c. The garriſon ſhould always be ſtronger than the townſmen.

Winter-quarters ſignify a place where a number of forces are laid up in the winter-ſeaſon, without keeping the regular guard. See *Winter*-QUARTERS.

GARRISON-TOWN, a ſtrong place in which troops are quartered, and do duty, for the ſecurity thereof, keeping ſtrong guards at each port, and a main guard in the market-place.

GARRISON, in geography, a town of Ireland, in the county of Fermanagh, and province of Ulſter: weſt long. 8° 20′, and north lat. 54° 16′.

GARTER, a ligature for tying up the ſtocking; but particularly uſed for the badge of a noble order of knights, hence denominated the

Order of the GARTER, a military order of knighthood, the moſt noble and antient of any lay-order in the world, inſtituted by king Edward III. This order conſiſts of twenty-ſix knights-companions, generally princes and peers, whereof the king of England is the ſovereign, or chief. They are a college or corporation, having a great and little ſeal.

Their officers are a prelate, chancellor, regiſter, king at arms, and uſher of the black rod. They have alſo a dean with twelve canons, and petty canons, vergers, and twenty-ſix penſioners, or poor knights. The prelate is the head. This office is veſted in the biſhop of Wincheſter, and has ever been ſo. Next to the prelate is the chancellor, which office is veſted in the biſhop of Saliſbury, who keeps the ſeals, &c. The next is the regiſter, who by his oath is to enter upon the regiſtry, the ſcrutinies, elections, penalties, and other acts of the order, with all fidelity. The fourth officer is garter, and king at arms, being two diſtinct offices united in one perſon. Garter carries the rod and ſcepter at the feaſt of St. George, the protector of this order, when the ſovereign is preſent. He notifies the elections of new knights, attends the ſolemnity of their inſtallations, carries the garter to the foreign princes, &c. He is the principal officer within the college of arms, and chief of the heralds. See KING *at arms*.

All theſe officers, except the prelate, have fees and penſions. The college of the order is ſeated in the caſtle of Windſor, with the chapel of St. George, and the chapter-houſe, erected by the founder for that purpoſe. The habit and enſign of the order are a garter, mantle, cap, george, and collar. The four firſt were aſſigned the knights companions by the founder; and the george and collar by Henry VIII. The garter (ſee plate CXI. fig. 1. n° 1.) challenges preheminence over all the other parts of the dreſs, by reaſon that from it the noble order is denominated; that it is the firſt part of the habit preſented to foreign princes, and abſent knights, who, and all other knights elect, are therewith firſt adorned; and it is of ſo great honour and grandeur, that by the bare inveſtiture with this noble enſign, the knights are eſteemed companions of the greateſt military order in the world. It is worn on the left leg between the knee and calf, and is enamelled with this motto, HONI SOIT QUI MAL Y PENSE; *i. e.* "ſhame to him that thinks evil hereof." The meaning of which is, that king Edward having laid claim to the kingdom of France, retorted ſhame and defiance upon him that ſhould dare to think amiſs of the juſt enterprize he had undertaken, for recovering his lawful right to that crown, and that the bravery of thoſe knights whom he had elected into this order, was ſuch as would enable him to maintain the quarrel againſt thoſe that thought ill of it.

The mantle (*ibid.* n° 2.) is the chief of thoſe veſtments made uſe of upon all ſolemn occaſions. The colour of the mantle is by the ſtatutes appointed to be blue. The length of the train of the mantle only diſtinguiſhes the ſovereign from the knights companions. To the collar of the mantle is fixed a pair of long ſtrings, antiently wove with blue ſilk only, but now twiſted round, and made of Venice gold and ſilk, of the colour of the robe, with knobs, or buttons, and taſſels at the end. The left ſhoulder of the mantle has from the inſtitution been adorned with a large garter, with the device HONI SOIT, &c. within this is the croſs of the order, which was ordained to be worn at all times by king Charles I. At length the ſtar was introduced, being a ſort of croſs irradiated with beams of ſilver (*ibid.* n° 3.)

The collar (*ibid.* n° 4.) is appointed to be compoſed of pieces of gold in faſhion of garters, the ground enamelled blue, and the motto gold. See COLLAR.

The manner of electing a knight companion into this moſt noble order, and the ceremonies of inveſtiture, are as follow. When the ſovereign deſigns to elect a companion of the garter, the chancellor belonging to this order draws up the letters, which paſſing both under the ſovereign's ſign manual and ſignet of the order, are ſent to the perſon by garter principal king at arms, and are in this manner, or to the ſame effect. "We, with the companions of our moſt noble order of the garter, aſſembled in chapter, holden this preſent day at our caſtle at Windſor, conſidering the virtuous fidelity you have ſhewn, and the honourable exploits you have done in our ſervice, by vindicating and maintaining our right, &c. have elected

Fig. 1. Order of the GARTER

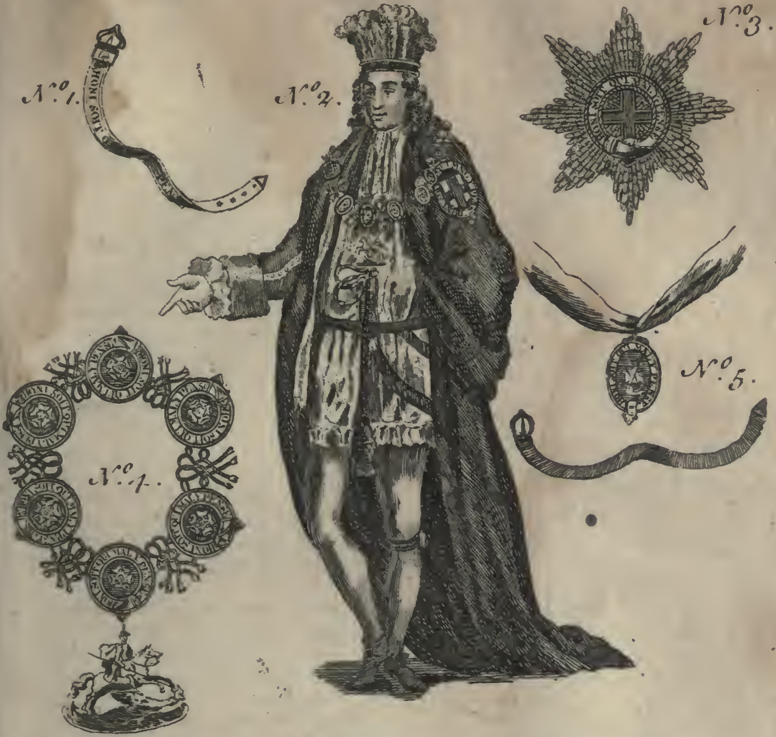


Fig. 2. GORE.

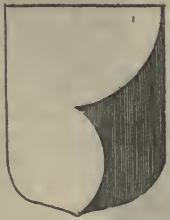


Fig. 3. GIRONNE'.

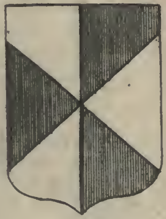


Fig. 4. GARDANT.

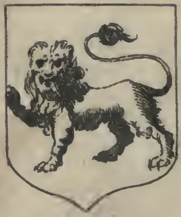
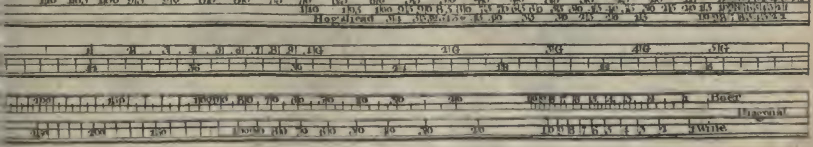


Fig. 5. GAUGING ROD.



J. Jeffrys sculp

“ elected and choſen you one of the companions of our order. Therefore, we require you to make your ſpeedy repair unto us, to receive the enſigns thereof, and be ready for your inſtallation upon the — day of this preſent month, &c.

The garter, which is of blue velvet bordered with fine gold wire, having commonly the letters of the motto of the ſame, is, at the time of election, buckled upon the left leg, by two of the ſenior companions, who receive it from the ſovereign, to whom it was preſented upon a velvet cuſhion by garter king at arms, with the uſual reverence, whilſt the chancellor reads the following admonition, enjoined by the ſtatutes. “ To the honour of God omnipotent, and in memorial of the bleſſed martyr St. George, tye about thy leg, for thy renown, this noble garter; wear it as the ſymbol of the moſt illuſtrious order, never to be forgotten, or laid aſide; that thereby thou mayeſt be admoniſhed to be courageous, and having undertaken a juſt war in which thou ſhalt be engaged, thou mayſt ſtand firm, valiantly fight, and ſucceſſively conquer.”

The princely garter being thus buckled on, and the words of its ſignification pronounced, the knight elect is brought before the ſovereign, who puts about his neck, kneeling, a ſky-coloured ribbon, (*ibid.* n° 5.) whereunto is appendant, wrought in gold within the garter, the image of St. George on horſeback, with his ſword drawn, encountering with the dragon. In the mean time, the chancellor reads the following admonition: “ Wear this ribbon about thy neck, adorned with the image of the bleſſed martyr and ſoldier of Chriſt, St. George, by whoſe imitation provoked, thou mayſt ſo overpaſs both proſperous and adverſe adventures, that having ſtoutly vanquiſhed thy enemies both of body and ſoul, thou mayſt not only receive the praiſe of this tranſient combat, but be crowned with the palm of eternal victory.”

Then the knight elected kiſſes the ſovereign's hand, thanks his majeſty for the great honour done him, riſes up, and ſalutes all the companions ſeverally, who return their congratulations. N° 2. *ib.* exhibits a view of a knight of the garter in the habit of this order.

Since the inſtitution of this order, there have been eight emperors, and twenty-eight kings, beſides numerous ſovereign princes enrolled as companions thereof. Its origin is ſomewhat differently related: the common account is, that it was erected in honour of a garter of the counteſs of Saliſbury, which ſhe dropped dancing with king Edward, and which that prince picked up; but our beſt antiquaries think it was inſtituted on account of the victory over the French at Creſſy, where the king ordered his garter to be diſplayed as a ſignal of the battle.

GARTH, ſignifies a little cloſe, or backſide, in the north of England; alſo a wear. See the article WEAR.

GARTHMAN, a term formerly uſed for a fiſher-man.

GARUM, among phyſicians, denotes the brine, or pickle, wherein anchovies, herrings, &c. are preſerved. See the article PICKLE.

GAS, among chemiſts, a term made uſe of by Helmont, to ſignify, in general, a ſpirit incapable of coagulation, ſuch as proceeds from fermented wine.

In particular, it has various ſignifications; thus, gas vitale, is the ſpirit of our life, the light and the balſam, which preſerves from corruption. The gas pingue ſulphureum is what is ſuddenly mortal, being lethiferous exhalations ariſing principally in caves and mines. Gas ſulphuris, the gas or ſpirit of ſulphur, is made by burning ſulphur under a glaſs bell ſet over a veſſel of water, till the water is ſufficiently impregnated with the ſulphur. The gas ſylveſtre is that inviſible and incoercible ſpirit which ariſes from vegetable juices under fermentation. Helmont makes ſeveral other diſtinctions of gas; as the gas ventoſum, which is mere air; the gas ſiccum, which is ſublimate de flatibus; the gas ſalium, and the gas fructuum, which are mere elementary water.

GASCOIN, or GASCOIGN, denotes the hinder thigh of a horſe, which begins at the ſtifle, and reaches to the ply or bending of the ham.

GASCONY, the moſt ſouth-weſt province of France, bounded by Guienne, on the north; by Languedoc, on the eaſt; by the Pyrenees, which ſeparate it from Spain, on the ſouth; and by the bay of Biſcay on the weſt.

The inhabitants of this province are remarkable for vaunting and pretending to im-

improbabilities; whence the like pretence, in others, is called a gaſconade.

GASSENHOVEN, or **GUTZENHOVEN**, a town of the Auſtrian Netherlands, fifteen miles eaſt of Louvain: eaſt longitude 5°, and north lat. 50° 55′.

GASTALDUS, or **CASTALDUS**, an officer antiently entertained in the courts of divers princes.

The gaſtaldus was what in Italy and Spain is now called major domo, or the maſter or ſteward of an houſhold. The gaſtaldus was a comes or count, which ſhews his office to have been very conſiderable.

In the laws of Italy we ſometimes meet with a gaſtaldus in the ſenſe of a carrier, and ſometimes as an eccleſiaſtical officer.

GASTEROSTEUS, *banſtickle*, in ichthyology, a genus of acanthopterygious fiſhes, diſtinguiſhed by having only three ſmall bones in the branchioſtege membrane, and the belly almoſt entirely covered with oblong bony laminæ.

To this genus belong the common ſtickle-back, the leſſer ſtickle-back, and the great ſtickle-back. See the article STICKLE-BACK.

GASTRO EPIPLOIC VEIN, a vein that opens into the vena portæ. See VEIN.

GASTRIC, in general, ſomething belonging to the ſtomach. See STOMACH.

GASTRIC JUICE, *graſtricus ſuccus*, among phyſicians, a thin, pellucid, ſpumous, and ſaltiſh liquor, which continually diſtills from the glands of the ſtomach, for the dilution of the food. See FOOD.

GASTRIC VESSELS, in anatomy, the arteries and veins of the ſtomach. See the articles ARTERY and VEIN.

GASTROCNEMIUS, in anatomy, the name of two thick, pretty broad, and oblong muſcles, which form a great part of what is called the calf of the leg. They are ſituated laterally with reſpect to each other, under the poples.

GASTROCNEMIUS is alſo the name of one of the extenſor-muſcles of the foot.

GASTROMANCY, γαςρομαντεια, a method of divination by water, practiſed by the antient Greeks in the following manner. They filled certain round glaſſes with fair water, about which they placed lighted torches: then invoked a dæmon, praying in a low, murmuring voice, and propoſed the queſtion to be ſolved. A chaſte and unpolluted boy, or a woman big with child, was appointed to obſerve with great care and exactneſs, all the alteration in the glaſſes; at the ſame time deſiring, beſeeching, and commanding an anſwer; which, at length, the dæmon uſed to return by images in the glaſſes; which, by reflexion from the water, repreſented what ſhould come to paſs.

GASTRORAPHY, γαςροραφία, in ſurgery, the operation of ſowing up wounds of the abdomen. See ABDOMEN.

There are two caſes in which this operation is abſolutely neceſſary; the firſt is, where the wound is ſo large, that there is no poſſibility of retaining the inteſtines by any other method; for as the inteſtines are continually puſhed forward in the act of inſpiration, by the action of the diaphragm and the abdomen, the falling down of the inteſtines in this caſe is unavoidable, and therefore the operation is neceſſary. The other is in large tranſverſe wounds of the abdomen, where the muſcles are divided, but the peritonæum is not concerned.

In wounds of the abdomen the chief inquiry is, whether the omentum or inteſtines are let out. If none of theſe have burſt through the wound, the lips of the wound muſt be kept as cloſe together as poſſible with the hands, and the patient kept with his head lying downwards, till the wound is ſufficiently ſecured from letting out the contents of the abdomen. But when the inteſtines are already fallen out, they muſt be returned with the greateſt expedition, leſt they ſhould receive any injuries from the external air. It is firſt to be examined, however, whether they have received any wound, or not; and whether they preſerve their natural warmth and colour: for where they are cold, livid, dry, or wounded, they are not to be returned ſuddenly, but fomented with warm milk and water, or wraped up for ſome time in the cawl of ſome animal newly killed, till they have in ſome degree recovered their natural heat and colour.

You will eaſily perceive, that there is ſome hurt in the inteſtines, though the wound does not immediately appear, if there is a more than ordinary flaccidity in them; in which caſe, the reſt of the inteſtines muſt be pulled gently forward till you find the wound. See the article INTESTINES.

If nothing of this ſort is the caſe, but the inteſtines are in their natural ſtate and condition, they muſt be inſtantly returned

turned in the following manner. The patient being placed in a ſupine poſture, and laid on that ſide that is oppoſite to the wound, the inteſtine muſt be returned by the aperture of the wound, with the two fore fingers; taking care never to take off one finger, till the other is on the gut. The patient is all the while to hold his breath, and the lips of the wound muſt be then brought together. If the inteſtines have been forced through a ſmall wound, and are afterwards ſo diſtended with wind, that they cannot eaſily be returned, it is neceſſary to pull the inteſtine gently forward, that more of it may come out, and the wind take up leſs room in any one part. An aſſiſtant ſhould then gently dilate the wound as far as may be, either with his hand, or with two hooks fixed in the internal membrane, while the ſurgeon returns the inteſtines. When this is done, the wound muſt be ſecured firſt with the hand, and then with the proper dreſſings; and, in this caſe, the ſurgeon may avoid the uſe of this painful operation. But if the wound is ſo narrow, that the gut can neither be reduced nor pulled forward, the aperture muſt be enlarged with the knife.

The operation of gaſtroraphy, when found neceſſary, may be performed in the following manner; firſt paſs a ſtrong double, or quadruple thread well waxed through too crooked needles, and with theſe ſtitch up both ends of the wound, beginning at one end with the upper lip of the wound, paſſing the needle through the peritonæum, muſcles of the abdomen, and the common integuments, from within outwards, leaving only the breadth of a thumb between the ſtitches, and the mouth of the wound, obſerving the ſame method in paſſing the other needle thro' the lower lip; and, while you are paſſing the needle with one hand, it will be proper to ſupport the lips of the wound with the other, to prevent the inteſtines from being wounded. In a wound of two fingers-breadth, one ſtitch in the middle will be ſufficient; but in larger wounds the ſtitches muſt be repeated in proportion to their ſize, leaving a thumb's breadth between each of the ſutures, the extremities of the thread are to be left hanging down on each ſide; and when the ſuture is finiſhed, while an aſſiſtant holds the lips of the wound together, theſe ends are to be tied in knots, in the following manner. Both ends of the threads are to be taken up, and to be tied in a double knot, paſſing a ſmall bolſter between the two knots, to prevent the ſkin from being hurt. Where there are more ſutures than one, you muſt begin at the upper part of the wound, tying them down in order; that before the laſt is tied, a ſoft tent of the ſize of a finger, with a thread faſtened to the end of it, may be introduced into the lower part of the wound. This tent will keep a paſſage open for the evacuation of grumous blood, or matter, which may be collected in the cavity of the abdomen. The wound, when all this is done, muſt be anointed with ſome vulnerary balſam, and covered with pledgits of lint, a ſticking plaſter, and bolſters; ſecuring all with the ſcapulary bandage.

GASTROTOMY, γαςροτομια, in ſurgery, the cutting open the abdomen and uterus, as in the cæſarian ſection. See the article CÆSARIAN.

GATE, in architecture, a large door, leading, or giving entrance into a city, town, caſtle, palace, or other conſiderable building: or a place giving paſſage to perſons, horſes, coaches, or waggons, &c. As to their proportion, the principal gates for entrance thro' which coaches and waggons are to paſs, ought never to be leſs than ſeven feet in breadth, nor more than twelve, which laſt dimenſion is fit only for large buildings. The height of a gate is to be 1 ½ of the breadth, and ſomewhat more; but as for common gates in inns, under which waggons go loaded with hay, ſtraw, &c. the height of them may be twice their breadth.

Paled **GATES**, ſuch as are ſet up in fences for ſhutting up the paſſages into fields, and other incloſures.

Theſe are of two ſorts, either of ſawed or cleft timber.

Opening of the **GATES** in aſtrology. See the article OPENING.

GATE, in the manege, the going or pace of a horſe.

GATE *of the ſea*, or SEA-GATE, in the ſea-language. When two ſhips are aboard one another, by means of a wave or billow, it is uſual to ſay they are aboard one another in a ſea-gate.

GATE, in geography, a chain of mountains that run through the middle of the hither Peninſula of India, from ſouth to north.

GATHER, in the ſea-language, is ſaid of a ſhip that gets the wind of another.

GATTON, a borough town of Surry, ſixteen miles ſouth of London, which ſends two members to parliament.

GAVEL, or GABLE, among builders. See the article GABLE.

GAVELET, in law, an antient and ſpecial ceſſavit uſed in Kent, where the cuſtom of gavel-kind continues, by which the tenant, if he withdraws his rent and ſervices due to the lord, forfeits his lands and tenements.

In reſpect to this gavelet the lord was to ſeek by award of his court from three weeks to three weeks, to find ſome diſtreſs upon the lands, until the fourth court; and if in that time he could find no diſtreſs on the premiſes whereby he might have juſtice of his tenant: then, at the fourth court, it was awarded, that the lord ſhould take the lands, *&c.* into his hands, in the name of a diſtreſs, and keep it a year and a day without manuring, in which ſpace of time, if the tenant did not come and pay his arrearages, and make the lord amends, then the lord was to go to the next county-court with his witneſſes of his own court, and pronounce there the proceſs; after which, by the award of his own court, he became entitled to enter and manure thoſe lands or tenements as his own. And if the tenant wanted to re enjoy his lands, *&c.* as he did before, he was then obliged to make agreement with the lord for the ſame.

GAVELET, in London, is a writ uſed in the huſtings, given to lords of rents in the city of London.

GAVELKIND, a tenure or cuſtom belonging to lands in the county of Kent, by which the lands of the father are, at his death, equally divided among all his ſons; or the land of a deceaſed brother, in caſe he leaves no iſſue, among all the brethren. This is by ſome called antient ſoccage-tenure: the cuſtom came from our ſaxon anceſtors, among whom the inheritance of lands did not deſcend to the eldeſt, but to all the ſons alike; and the reaſon why it was retained in Kent is, becauſe the kentiſh men were not conquered by the Normans in the time of William I.

The particular cuſtoms attending this tenure are, that the heir, at the age of fifteen, may give or ſell his lands in gavelkind; and though the father is attainted of treaſon and felony, and ſuffers death, the ſon ſhall inherit. A wife ſhall be endowed of a moiety of the gavelkind-lands, of which her huſband died ſeiſed, during her widowhood. Likewiſe a huſband may be tenant by curteſy of half his wife's lands, without having any iſſue by her; but if he marries again, not having iſſue, he forfeits his tenancy.

GAVELMAN, a tenant liable to pay tribute.

GAVELMED, the duty of mowing graſs, required by the lord of his cuſtomary tenants.

GAVEREN, or WAVEREN, a town of the Auſtrian Netherlands, ſituated on the eaſt bank of the river Scheld; eaſt long. 3° 35′, north lat. 51°.

GAUGE, or GAGE. See GAGE.

GAUGE LINE, on the gauging-rod. See the article GAUGING.

GAUGE-POINT, of a ſolid meaſure, the diameter of a circle, whoſe area is equal to the ſolid content of the ſame meaſure. Thus, the ſolidity of a wine-gallon being 231 cubic inches, if you conceive a circle to contain ſo many inches, the diameter of it will be 17.15; and that will be the gauge-point of wine-meaſure. And an ale-gallon, containing 282 cubic inches, by the ſame rule, the gauge-point for ale-meaſure will be found to be 19.15. After the ſame manner, may the gauge-point of any foreign meaſure be obtained; and from hence may be drawn this conſequence, that when the diameter of a cylinder, in inches, is equal to the gauge-point of any meaſure, given likewiſe in inches, every inch in length thereof will contain an integer of the ſame meaſure, *e. gr.* in a cylinder whoſe diameter is 17.15 inches, every inch in height contains one entire gallon in wine meaſure; and in another, whoſe diameter is 18.95 inches, every inch in length contains one ale-gallon.

GAUGER, a king's officer, who is appointed to examine all tuns, pipes, hogſheads, and barrels of wine, beer, ale, oil, honey, *&c.* and give them a mark of allowance, before they are ſold in any place within the extent of his office.

There are divers ſtatutes that mention this officer and his office; as by 27 Ed. III. c. 8. all wines, *&c.* imported are to be gauged by the king's gaugers, or their deputies, otherwiſe they ſhall be forfeited, or their value; and on default of the gauger, that he be not ready to do his office when required, or that he defrauds in doing his office to the damage of the buyer or ſeller, he ſhall pay the party grieved his treble damage, loſe his office, be puniſhed by impriſonment, and be ranſomed at the king's will: and in caſe leſs be found in the tun or pipe than ought to be, the value of as much as ſhall lack, ſhall be deducted in the payment.

Every gauger ſhall truly, within the limits of his office, gauge all tuns, butts, pipes, tierces, puncheons, tertians, hogſheads, barrels, and rundlets; and mark on the head of every veſſel the contents, upon pain to forfeit to the party to whoſe uſe the wine, &c. ſhall be ſold, four times the value of that which the veſſel marked ſhall lack of his content: the ſame forfeiture ſhall be recovered by an original writ, &c. and every perſon ſelling the wine, &c. in the veſſel marked, ſhall allow of the price, the value of the lack of gauge, or default of filling, upon pain of forfeiture to the buyer, double the value, to be recovered with coſts as before. No brewer ſhall put to ſale any beer or ale in veſſels brought from beyond the ſea, within the city of London, or ſuburbs of the ſame, or within two miles compaſs without the ſuburbs, before the ſame be gauged, and the true content of every ſuch veſſel ſet upon the ſame, by the gallon appointed for beer and ale, according to the ſtandard, by the maſter and wardens of the coopers of London.

GAUGING, the art or act of meaſuring the capacities or contents of all kinds of veſſels, and determining the quantities of fluids or other matters contained therein.

The art of gauging is that branch of the mathematics called ſtereometry, or the meaſuring of ſolids; becauſe the capacities of all ſorts of veſſels uſed for liquors, as cubical, parallelopipedal, cylindrical, ſpheroidal, conical, &c. are computed as though they were really ſolid bodies, and reduced thereby to ſome known cubic meaſure, as gallons, quarts, pints, &c. The principal veſſels that come under its operation are pipes, barrels, rundlets, and other caſks; alſo backs, coolers, vats, &c.

The ſolid content of cubical, parallelopipedal, and priſmatical veſſels is eaſily found in cubic inches, or the like, by multiplying the area of the baſe by the perpendicular height. And for cylindrical veſſels, the ſame is found by multiplying the area of the baſe by the perpendicular altitude as before. See the articles CUBE, PARALLELEPIPED, &c.

Caſks of the uſual form of hogſheads, kilderkins, &c. may be conſidered as ſegments of a ſpheroid cut off by two planes, perpendicular to the axis; which brings them to Oughtred's theorem for meaſuring ale and wine-caſks, which is thus: add twice the area of the circle at the bung, to the area of the circle of the head; multiply the ſum by one third of the length of the caſk, the product is the content of the veſſel in cubic inches.

But for accuracy, Dr. Wallis, Mr. Caſwell, and others, think that moſt of our caſks had better be conſidered as fruſtums of parabolic ſpindles, which are leſs than the fruſtums of ſpheroids of the ſame baſe and height, and give the capacity of veſſels nearer the truth than either Oughtred's method, which ſuppoſes them ſpheroids; or than that of multiplying the circles of the bung and head, into half the length of the caſk, which ſuppoſes them parabolic conoids; or than that of Clavius, &c. who takes them for two truncated cones, which is fartheſt off of all.

The common rule for all wine or ale-caſks, is to take the diameters at the bung and at the head, by which you may find the area of the circle there; then taking two thirds of the area of the circle at the bung, and one third of the area of the circle at the head, and adding them together into one ſum; this ſum multiplied by the internal length of the caſk, gives the content in ſolid inches; which are converted into gallons by dividing by 282 for ale, and 231 for wine-gallons.

But gauging, as now practiſed, is chiefly done by means of inſtruments called gauging-rods or rulers, which do the buſineſs at once, and anſwers the queſtion without ſo much calculation, which is no inconſiderable addition both to the eaſe and diſpatch of the work, tho' it is not ſo much to be depended on.

The methods of gauging which are moſtly uſed, is by the four-foot gauging-rod and Everard's ſliding ruler: the deſcription and uſes of both are as follows:

The four-foot GAUGING-ROD (plate CXI. fig. 5.) is uſually made of box, and conſiſts of four rules, each a foot long, and about three eighths of an inch ſquare, joined together by three braſs-joints; by which means the rod is rendered four feet long when the four rules are opened, and but one foot when all are folded together.

On the firſt face of this rod, marked 4, are placed two diagonal lines, one for beer and the other for wine; by means of which the content of any common veſſel in beer or wine-gallons, may be readily found, by putting the braſed end of the gauging-rod into the bung-hole of the caſk, with the diagonal lines upwards, and thruſt this braſed end to the meeting of the head and ſtaves; then with chalk make a mark at the middle of the bung-hole of the veſſel, and alſo on the diagonal lines of the rod, right againſt or over one another, when the braſed end is thruſt home to the head and ſtaves; then turn the gauging-rod to the other end of the veſſel, and thruſt the braſed end home to the end as before. Laſtly, ſee if the mark made on the gauging-rod, come even with the mark made on the bung-hole, when the rod was thruſt to the other end; which if it be, the mark made on the diagonal lines, will, on the ſame lines, ſhew the whole content of the caſk in beer or wine-gallons. If the mark made on the bung-hole be not right againſt that made on the rod, when you put it the other way, then right againſt the mark made on the bung-hole, make another on the diagonal lines; and the diviſion on the diagonal line, between the two chalks will ſhew the whole content of the veſſel in beer or wine-gallons.

Thus, *e. gr.* if the diagonal line of a veſſel be $28\frac{4}{10}$ inches, its content in beer-gallons will be nearly 51, and in wine-gallons 62.

If a veſſel be open, as a half barrel, tun, or copper, and the meaſure from the middle on one ſide to the head and ſtaves be 38 inches, the diagonal line gives 122 beer-gallons; half of which, *viz.* 61, is the content of the half tub.

If you have a large veſſel, as a tun or copper, and the diagonal line taken by a long rule be 70 inches; then every inch at the beginning-end of the diagonal line call 10 inches: thus 10 inches become 100 inches; and every tenth of a gallon call 100 gallons; and every whole gallon call 1000 gallons.

On the ſecond face, 5, are a line of inches and the gauge-line, which is a line expreſſing the areas of circles (whoſe diameters are the correſpondent inches) in ale-gallons: at the beginning is wrote *Ale-area*. Thus, to find the content of any cylindrical veſſel in ale-gallons: ſeek the diameter of the veſſel in inches, and juſt againſt it, on the gauge-line, is the quantity of ale-gallons contained at one inch deep: this multiplied by the length of the cylinder, will give its contents in ale-gallons.

On the third face, 6, are three ſcales of lines; the firſt, at the end of which is written *Hogſhead*, is for finding how many gallons there are in a hogſhead, when it is not full, lying with its axis parallel to the horizon. The ſecond line, at the end of which is written *B. L.* is for the ſame purpoſe. The third is to find how much liquor is wanting to fill up a butt, when it is ſtanding; at the end of it is wrote *B. S.* ſignifying, *butt ſtanding*.

Half way the fourth face of the gauging-rod, 7, there are three ſcales of lines, to find the wants in a firkin, kilderkin, and barrel, lying with their areas parallel to the horizon. They are diſtinguiſhed by the letters *F. K. B.* ſignifying a firkin, kilderkin, and barrel.

The uſe of the lines on the two laſt faces is very eaſy; you have only to put it downright into the bung-hole to the oppoſite ſtaves, if the veſſel, you want to know the quantity of ale-gallons contained therein, be lying: and then where the ſurface of the liquor cuts any one of the lines appropriated to that veſſel, and be the number required.

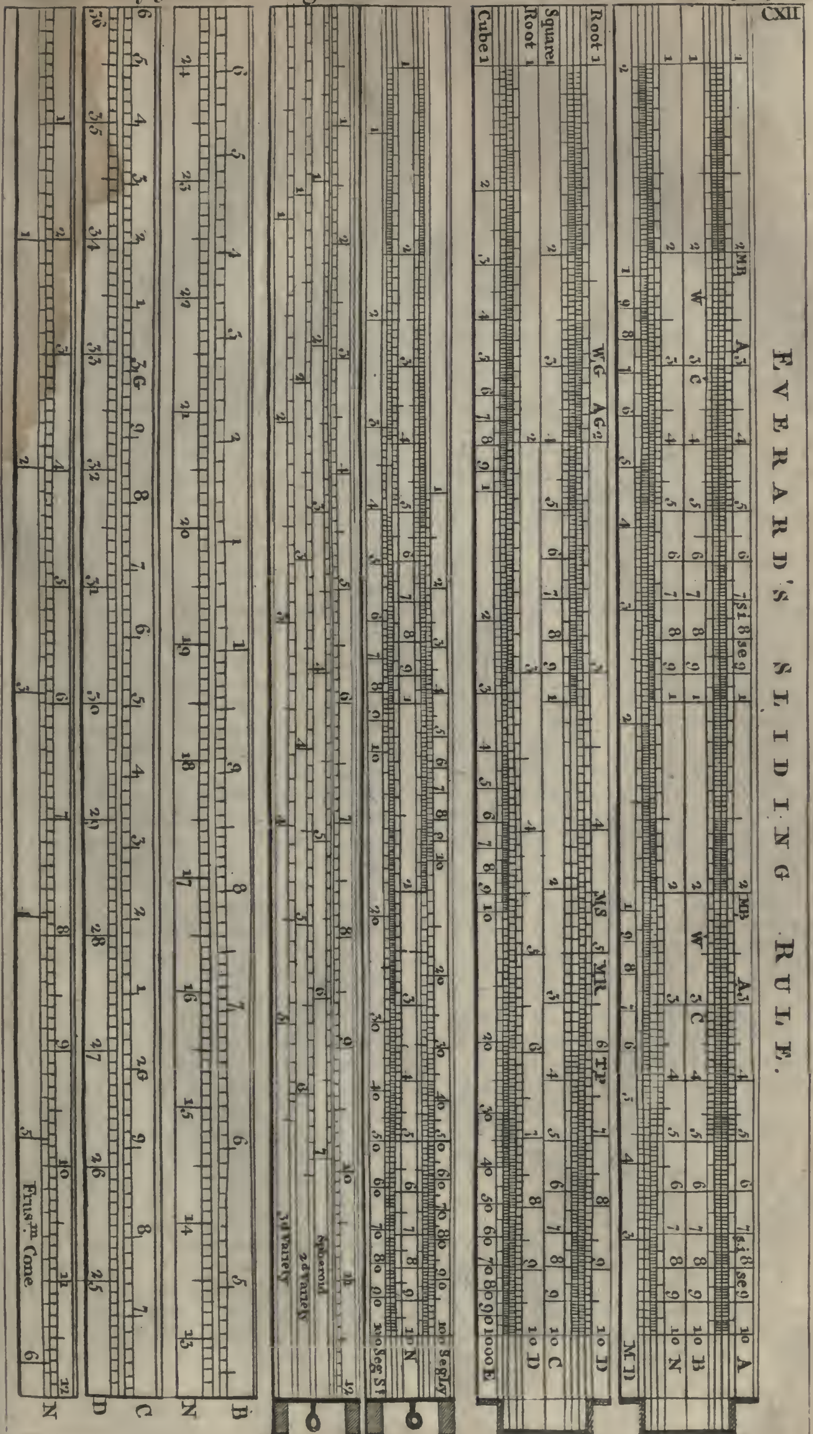
Everard's ſliding-rule is principally uſed in gauging, being ordinarily made of box, a foot long, an inch broad, and $1\frac{6}{10}$ inch thick, with two ſmall ſcales to ſlide in it, which may be drawn out, one towards the right hand, and the other towards the left, till the whole be 3 feet long. See plate CXII.

The principal lines on the inſtrument are thoſe commonly known by the name of Gunter's line, or line of numbers, which are here diſtinguiſhed one from another by certain letters, ſet at the end of the lines, towards the right hand: thus the lines D are each of them one ſingle line of numbers, beginning at the end of the rule towards the left hand, and from thence continued to the other end. The lines A, B, and C, are called double numbers, each being two lines or radiuſes of numbers; the line E is called triple numbers, being three radiuſes of numbers: this triple line is equal in length to the double lines, and all to the ſingle line; for all the five begin and end at the ſame point. On the line A are four braſs center-pins, two in each radius; one in each of which is marked MB, to ſignify that the number it is

ſet

The Inside of ye 3 Sliders. Edges of the Rule. Faces of the Rule. *facing page 1404*

CXII



J. Jefferys sculp

ſet againſt, 2150.42, is the cubic inches in a malt-buſhel. The other two are marked with A. to ſignify that the numbers they are ſet againſt, 282, are the cubic inches in an ale-gallon. Cloſe to the figure 7, in the firſt radius on the ſame line, is a dot marked *ſ i.* ſet exactly over .707, denoting .707 to be the ſide of a ſquare inſcribed in a circle, whoſe diameter is unity. Cloſe to 9 is another dot, marked *ſ e.* ſet over .886, which is the ſide of a ſquare, equal to the area of a circle, whoſe diameter is unity. Another dot nigh W, is ſet over 231, the cubic inches in a wine-gallon; and another near C, is ſet over 3.141592, the circumference of a circle, whoſe diameter is unity. The line marked M D. to ſignify *malt-depth,* is no more than a line of numbers in a reverſe order, the number 1 being ſet directly againſt M. B. on the firſt radius, and is of exceeding great uſe in caſting up of malt-gauges.

On the line D. there are four center-pins, the firſt, marked W G. is the gauge-point of a wine-gallon, *i. e.* the diameter of a cylinder whoſe height is 1 inch, and content 231 cubic inches, or a wine-gallon, which is 17.15 inches. The ſecond center-pin, marked A G. ſtands at the gauge-point for an ale-gallon, which is 18.95 inches. The third, M S. ſtands at 46.3, the ſide of a ſquare, whoſe content is equal to the inches of a ſolid buſhel. The fourth, M R. is the gauge-point for a malt-buſhel, which is 52.32 inches. The two lines of ſegments are each numbered from 1, 2, &c. to 100: the firſt is for finding the ullage of a caſk taken as the middle fruſtum of a ſpheroid, lying with its axis parallel to the horizon: and the ſecond for finding the ullage of a caſk ſtanding.

Again, on one of the narrow ſides, noted *e,* are, 1°, a line of inches, numbered 1, 2, 3, &c. to 12, and each ſubdivided into 10 equal parts. 2°. A line, by which, with that of inches, we find a mean diameter for a caſk, in the figure of a middle fruſtum of a ſpheroid. 3°. A line for finding the mean diameter of a caſk in the figure of the middle fruſtum of a parabolic ſpindle, which gaugers call the ſecond variety of caſks. 4°. One for the third variety, which is of a caſk in the figure of two parabolic conoids abutting on a common baſe.

On the other narrow face, marked *f.* are, 1°. A foot, divided into 100 equal parts, marked F M. 2°. A line of inches, noted I M. 3°. A line F C. for finding the mean diameter of the fourth variety of caſks, which is the middle fruſtum of two cones, abutting on a common baſe.

On the backſide of the ſliding piece is a line of inches from 13 to 36, when the two pieces are put endwiſe; and againſt that, the correſpondent gallons, or hundred parts, that any ſmall or like open veſſel, from 13 to 36 inches diameter, will contain at one inch deep.

¶ *The uſes of the ſliding-rule in ſome parts of arithmetic.*

Problem I. Having two numbers given, to find a third geometrically proportional unto them; and to three, a fourth; and to four, a fifth, &c.

Find one of the numbers given, upon the line B, and ſet it againſt the other given number, on the line A; then find the ſame number on B (which was laſt counted) upon A; and againſt this third upon B, is the fourth on A. In like manner, againſt the fourth on B, you have the fifth on A, &c.

Example. Let it be required to find a third proportional to theſe two numbers, 2 and 4, which may bear the ſame proportion to 4, that 4 does to 2?

Draw out the ſliding-rod, till 2 upon B ſtand againſt 4 upon A; then againſt 4 upon B is 8 (the third proportional) upon A; and againſt this third (*viz.* 8) upon B, is 16 upon A, which is the fourth proportional, &c. Contrariwiſe, if it were required to find a third proportional to the ſame numbers, 2 and 4, which may bear the ſame proportion to 2, that 2 bears to 4? Set 4 in the ſecond radius upon A, to 2 upon B; then againſt 2 upon A (towards the left hand) is 1, the third proportional; and againſt 1 upon A, is .5, the fourth upon B: alſo againſt this fourth upon A, is .25, the fifth proportional on B, &c.

Problem II. One number being given to be multiplied by another, to find the product. In multiplication, either of whole numbers, mixed or decimal fractions, the proportion is,

As 1 : the multiplicator :: the multiplicand : the product.

Example. Let it be required to multiply 6 by 4. The proportion then is as 1 : 4 :: 6 : 24. Therefore ſet 1 upon the the line B, to 4 upon the line A; then againſt 6 upon B, is 24, the product ſought, upon A.

Problem III. One number being given to be divided by another, to find the quotient. In diviſion, both of whole numbers and mixed, the proportion is, as the diviſor is to 1, ſo is the dividend to the quotient.

Example. Let it be required to divide 24 by 4, the proportion is, as 4 : 1 : : 24 : 6. Therefore ſet 4 upon B, to 1 upon A; and then againſt 24 upon B, is 6 upon A. which is the quotient ſought.

Problem IV. Three numbers being given, to find a fourth in direct proportion.

Rule. Set the firſt number given upon B, to the ſecond upon A, and then againſt the third number given upon B, is the fourth number ſought upon A.

Example. If 8 quarters of malt will make 20 barrels of ſmall beer, how many barrels of ſuch beer will 22 quarters make?

Set 8 upon B, to 20 upon A; and then againſt 22 upon B, is 55 upon A; and ſo many barrels will 22 quarters make.

Problem V. To three numbers given, to find a fourth in an inverſed proportion.

Rule. Set the third number upon A, to the firſt (being of the ſame denomination) upon B; and then againſt the ſecond number upon A, you have the fourth upon B.

Example. If 8 men do any piece of work in 9 days, in how many days can 12 men do the ſame work?

Set 12 upon A, to 8 upon B; then againſt 9 upon A, is 6 upon B, which is the anſwer. For 12 men may do the ſame work in 6 days, which 8 men will do in 9 days.

Problem VI. Betwixt two numbers given to find a mean geometrical proportional.

Rule. Set one of the numbers given upon C, to the ſame number upon D; and then againſt the other given upon C, is the geometrical mean ſought upon D.

Example. Let the numbers given be 50 and 72, to find a geometrical mean, *&c.* Set 50 upon C, to 50 upon D; and then againſt 72 upon C, is 60 upon D; ſo 60 is the geometrical mean betwixt 50 and 72. Or thus, ſet 72 upon C, to 72 upon D; and then againſt 50 upon C, is 60 upon D, the mean as before.

To find the ſquare or cube roots of any number, let the lines C and D for the firſt, and D and E for the ſecond, be applied to one another, ſo that 10 at the end of D be even with 10 at the end of C; and 10 at the end of D be even with 10 at the end of E; the lines in this caſe are like a table, ſhewing the ſquare or cube roots of any number by inſpection; for againſt any number upon C, you have the ſquare root thereof upon D; and againſt any number upon E, you have the cube root thereof upon D: *& e contra.*

The uſe of the rule in meaſuring ſuperficies: and firſt of a circle.

Problem I. The diameter or circumference of a circle, either being given, to find the other. The circumference of that circle whoſe diameter is unity, is 3.1415926536; but for practice, the four firſt figures are ſufficient; therefore, as 1 : 3.1415 : : the diameter of any circle to its circumference. By the rule thus, ſet 1 on the line A, againſt 3.1415 on B; then againſt any diameter on the line A, you have the circumference on B: *& e contra.*

Againſt	20	you have theſe circumferences	62.851
	30		94.247
	40		125.663
	50		157.079

Or contrariwiſe againſt theſe circumferences	20	you have theſe diameters	6.366
	30		9.549
	40		12.732
	50		15.915

Problem II. The diameter of any circle being given, to find the area (or any part thereof) in inches, or in ale or wine-gallons. 1. For the whole area in inches. The area of a circle is equal to the product, or rectangle, of half the diameter into half the circumference; that is, if half the diameter be multiplied by half the circumference, the product will be the area: thus, when the diameter is 1, the circumference is 3.1415, the half of which is 1.5707, which multiplied by half the diameter (*viz.* .5) the product will be the area of that circle, whoſe diameter is 1, *viz.* .785398.

The areas of all circles are in proportion one to another, as the ſquares of their diameters: therefore, as the ſquare of the diameter of any circle is to the area of that circle, ſo is the ſquare of the diameter of any other circle to the area thereof. Now as the ſquare of 1 is but 1, it muſt be as 1 : .785398 : : ſquare of the diameter of any circle to the area thereof. So .785398 is a fixed multiplicator; and if an unit with cyphers be divided by .785398, the quotient will be 1.27324, a fixed diviſor: and by either of theſe numbers may the area of any circle be found, either by multiplication or diviſion. For if the ſquares of any diameter be multiplied or divided by theſe numbers, the product or quotient will be the area in inches, feet, or yards, according as the diameter was meaſured in inches, feet, *&c.*

But with more expedition by the rule. Set 1 upon the line D, to .785398 upon C. The rule being thus ſet, the lines are like a table of circles, areas to all diameters: for againſt any diameter upon the line D, you have the area thereof upon C. Thus if the diameter is 20, the area is 314.159; if it is 25, the area is 490.87 inches. And on the contrary if the area is 300, the diameter is 19.54; if 400, the diameter is 22.56 inches.

The area in inches divided by 282, the cubic inches in an ale-gallon, or by 231 for wine-gallons, gives the area for either reſpectively; or you may uſe any other diviſor, according to the meaſure you want. But without knowing the inches contained in any area, the area in gallons may be found thus: divide .785398 by 282. the quotient will be .0027851 ale-gallons; or by 231, if for wine-gallons, and it gives .0033999. Theſe numbers are the areas of circles in ale and wine-gallons, whoſe diameters are 1; and are fixed multiplicators for finding the area of all circles in either of theſe meaſures; for if the ſquare of the diameter of any circle be multiplied by either of theſe numbers, the product is the area in ale or wine-gallons reſpectively.

If you would effect this by diviſion, the ſeveral diviſors are thus found: multiply the diviſor for finding the area in inches, *viz.* 1.27324, by 282, or 231, the products 359.05 for ale-gallons, and 294.11 for wine-gallons, are the diviſors ſought. And the ſquare of the diameter of any circle divided by one of theſe, gives the reſpective area.

But the area of any circle may be more readily found by the help of fixed numbers, called gauge-points; and theſe numbers are the diameters of thoſe circles whoſe content, at 1 inch deep, is equal to the reſpective gallon to which they belong. They are the ſquare roots of the diviſions laſt mentioned, that for A. G. 18.95, for W. G. 17.15, on the rule: thus, ſet 18.95 (the gauge-point for ale-gallons) upon D, to 1 upon C; then againſt any diameter upon D, you have the area upon C. The like for wine-gallons, by the proper gauge-point. Note, when the area of any circle is ſought in ale-gallons, if the diameter be more than 18.95 and leſs than 100, ſet the gauge-point upon D, to 1 at the beginning of C. Or when the diameter is leſs than the gauge-point, or more than 100, then ſet the gauge-point to 1, in the middle upon C. Laſtly, to find any part of the area, ſet the gauge-point to $\frac{1}{3}$, or $\frac{1}{2}$, or any other part of 1, then againſt the diameter you have the like part of the area.

From what has been ſaid, it will not be difficult to uſe the rule in gauging the areas of all right lined figures; and when the area is found, the ſolidity is eaſily obtained. Thus, for example, the diameter, depth, and content of any cylindrical tun, any two being given, to find the third. In this problem are three queſtions, all reſolved at once ſetting the rule: 1. By the depth and content to find the diameter. Example. Suppoſe the depth 40 inches, and the content 1800 ale-gallons, what is the diameter?

Set 40, the depth, upon C, to the gauge-point upon D; then againſt 1800, the content, upon C, is 127.1 inches, the diameter ſought.

2. By the diameter and content, to find the depth, without moving the rule: ſay

As 127.1, the diameter,	upon	D
is to 1800, the content;		C
ſo is the gauge-point to		D
40, the depth,		C

3. By the depth and diameter, to find the content, the rule ſtanding as before: ſay,

As the gauge-point	upon	D
is to 40, the depth,		C
ſo is 127.1, the diameter,		D
to 1800, the content,		C

Note, as a circle is the baſe of a cylinder, ſo a triangle, quadrangle, or any other plane ſuperficies, may repreſent the baſe of a priſm: for if there be planes erected perpendicularly upon the lines which encompaſs any ſuch ſuperficies, they will generate a ſolid, which may be called a priſm; and the content of any ſuch ſolid is found by multiplying the area of the baſe by the altitude, or diſtance from one baſe to another.

The uſe of the rule in GAUGING *of malt.* The duty upon malt is charged upon the buſhel, and ſo proportionably for greater or leſſer quantities. The buſhel here intended is the Wincheſter-buſhel, which contains 2150.42 ſolid inches, but 2150 will be near enough for practice.

If the area in inches, of any plane figure, be divided by 2150, the quotient ſhews the buſhels and parts of a buſhel, which ſuch a figure or veſſel contains at one inch deep. Example. There is a ciſtern or vat, whoſe baſe is a rectangular parallelogram, the length is 72 inches, and the breadth 48 inches, what is the area, at 1 inch deep? Anſw. 1.607, that is, 1 buſhel and .607 thouſand parts of a buſhel. For 72 multiplied by 48, is 3456; and this divided by 2150, gives 1.607. But the area of any figure may be more readily found by the lines A and B, upon the rule: thus, as 2150 upon A, is to one of the ſides upon B; ſo is the other ſide upon A, to the area upon B: ſo in the example above, ſet 2150 upon A, to 72 upon B; then againſt 48 upon A, is 1.607 upon B. Or ſet 2150 upon A, to 48 upon B; then againſt 72 upon A, is 1.607 upon B.

The area thus found, being multiplied by the mean depth in inches, gives the content of ſuch a ciſtern at that depth and ſo for any quantity of malt upon the floor; but care muſt be taken in finding the mean depth of any quantity of malt, either in the ciſtern or upon the floor, by reaſon of the unevenneſs of the ſurface of the malt, and of the bottom of the ciſtern or floor upon which it was laid; in order to which, take the depth in 6, 8, or 10 places; and add all theſe depths together, and divide the ſum by the number of places in which the depths are taken, the quotient will be the mean depth required.

Barley is ſometimes ſteeped in round veſſels, and the area of a circle in buſhels is thus found: take the diameter in inches, and let the ſquare thereof be multiplied by .0003653, or divided by 2737.47, the product or quotient will be the area ſought.

Example. Suppoſe the diameter of any veſſel be 60 inches, this ſquared is 3600, and this multiplied by .0003653, or divided by 2737.47, gives 1.315, the area required.

But for any round veſſel, the rule gives the area in buſhels by inſpection, by help of a certain number called the gauge-point, which in this caſe is 52.32 (being the diameter of a circle, whoſe area is 2150, the ſolid inches in a buſhel). Thus in the example above, the diameter was 60 inches, therefore ſet the gauge-point (*viz.* 52.32) upon D, to 1 upon C; then againſt 60 upon D, is 1.315, the area upon C. And the rule being thus ſet againſt any diameter upon D, you have the area upon C.

But a ciſtern, couch, or floor-gauge may be more ſpeedily and expeditiouſly caſt up by the line M D, ſignifying malt depth. On this line always find the depth of the ciſtern, couch, or floor; then ſay, as the depth upon the line M D, is to the length or breadth upon B, ſo is the length or breadth upon A, to the content in malt-buſhels upon B. Example. Admit a floor whoſe length is 160, breadth 132, and depth 8.1 inches, what is the content in malt-buſhels?

Operation by the rule.

Set the depth 8.1 on M D, to the length 160 on the line B; then againſt the breadth 132 upon A, you have 79.5 upon B, the content in malt-buſhels. Thus,

M D.	B.	A.	B.
as 8.1 :	160 : :	132 :	79.5
Depth.	Length.	Breadth.	Content.

Or thus:

M D.	B.	A.	B.
as 8.1 :	132 : :	160 :	79.5
Depth.	Breadth.	Length.	Content.

GAULTHERIA, in botany, a genus of the decandria monogynia claſs of plants: the calyx is a double permanent perianthium: the corolla conſiſts of a ſingle bell-ſhaped quinquefid petal; the fruit is a roundiſh, obtuſe, five cornered, depreſſed capſule, compoſed of five valves, and containing five cells: the ſeeds are numerous, oſſeous, and angular.

GAUNT-BELLIED, in the manege, is ſaid of a horſe whoſe belly ſhrinks up towards his flanks.

GAUNTLET, or **GANTLET**. See the article GANTLET.

GAVOTTA, or **GAVOTTE**, is a kind of dance, the air of which has two briſk and lively ſtrains in common time, each of which ſtrains are played twice over. the firſt has uſually four or eight bars, and the ſecond contains eight, twelve, or more. The firſt begins with a minim, or two crotchets, or notes of equal value, and the hand-riſing; and ends with the fall of the hand upon the dominant or mediant of the mode, but never upon the final, unleſs it be a rondeau: and the laſt begins with the riſe of the hand, and ends with the fall upon the final of the mode.

Tempi di GAVOTTA is when only the time or movement of a gavotte is imitated, without any regard to the meaſure, or number of bars or ſtrains.

Little airs are often found in ſonatas, which have this phraſe to regulate their motions.

GAURA, in botany, a genus of the octandria-monogynia claſs, the corolla of which conſiſts of four oblong petals;

the fruit is an oval, four cornered capſule, containing a ſingle oblong, angular ſeed.

GAURS, in matters of religion, an antient ſect of the magicians in Perſia. They have a ſuburb at Iſpahan, which is called Gaurabad, or the town of the gaurs, where they are employed only in the meaneſt and vileſt drudgery: but they chiefly abound in Kerman, the barreneſt province in all Perſia, where the mahometans ſuffer them to live with ſome freedom, and in the full exerciſe of their religion. Some ages ago many of them fled into India where their poſterity remain to this day.

They are a poor harmleſs ſort of people, zealous in their ſuperſtition, rigorous in their morals, and exact in their dealings: they profeſs the worſhip of one God alone, the belief of a reſurrection, and a future judgment, and utterly deteſt all idolatry, though the mahometans believe them to be the moſt guilty of it. It is true, they perform their worſhip before fire, for which they have an extraordinary veneration, as believing it to be the moſt perfect emblem of the deity. They have the ſame veneration for Zoroaſter that the Jews have for Moſes, eſteeming him a prophet ſent from God.

GAWSE, or GAWZE, in commerce, a very ſlight, thin, open kind of ſtuff, made of ſilk, and ſometimes of thread; there are alſo figured gawzes, and ſome with gold or ſilver flowers on a ſilk ground.

GAZE-HOUND, or GAST-HOUND, one that makes more uſe of his ſight than of his noſe. Such dogs are much uſed in the north of England: they are fitter in an open champain country, than in buſhy and woody places. If at any time a well-taught gaze-hound takes a wrong way, he will return upon a ſignal and begin the chaſe afreſh. He is alſo excellent at ſpying out the fatteſt of a herd, and having ſeparated it from the reſt, will never give over the purſuit till he has worried it to death.

GAZELLA, in zoology, the name of ſeveral ſpecies of goat: as, 1. The african gazella, called alſo antelope and dorcas lybica, the horns of which are cylindric and half way arched. 2. The indian gazella, or antelope, with very long, cylindric, and ſtraight horns, annulated at the baſe. 3. Another ſpecies of african gazella, with cylindric, arched, and perfectly annulated horns. This laſt is a ſmall, but very beautiful ſpecies, and greatly reſembles the common deer in ſhape: the horns, which ariſe from the middle of the forehead, are of a beautiful black colour, and annulated all the way from the baſe to the very tips. See a figure of it in plate CXIII. fig. 1.

GAZETTE, a news-paper, or printed account of the tranſactions of all the countries in the known world, in a looſe ſheet or half ſheet. This name is with us confined to that paper of news publiſhed by authority.

The word is derived from gazetta, a venetian coin, which was the uſual price of the firſt news-paper printed there, and which was afterwards given to the paper itſelf.

GAZONS, in fortification, pieces of freſh earth, covered with graſs, and cut in form of a wedge, about a foot long and half a foot thick, to line the outſides of works made of earth, as ramparts, parapets, *&c.* The firſt bed of gazons is fixed with pegs of wood; the ſecond bed ſhould be ſo laid as to bind the former, by being placed over its joints; and ſo continued till the works are finiſhed. Betwixt theſe beds it is uſual to ſow all ſorts of binding herbs, in order to ſtrengthen the rampart.

GEAR, or *About your* GEAR, in the ſea-language, a word of command to work on all hands.

GEERS, or CHAINS, in country-affairs, the trappings and other harneſs belonging to draught-horſes or oxen.

GEESE, in ornithology. See GOOSE.

GEHENNA, a term mentioned in ſeveral parts of ſcripture, which our engliſh tranſlators have rendered hell. See HELL.

GELÆOPACHIA, in natural hiſtory, a claſs of mineral inflammable fluids, of a thicker conſiſtence, and opake; ſuch is piſſaſphaltum. See PISSASPHALTUM.

GELÆOSPILA. another claſs of inflammable mineral fluids, of a thinner conſiſtence, and pellucid: ſuch is naphtha. See the article NAPHTHA.

GELATINOUS, in pharmacy and medicine, any thing approaching to the glutinous conſiſtence of a gelatina, or jelly.

GELD, in our old cuſtoms, a ſaxon word ſignifying money, or tribute: alſo a compenſation for ſome crime committed. See the article GILD.

Hence wergeld, in our ancient laws, was uſed for the value of a man ſlain; and orfgeld, of a beaſt. See ORFGELD.

Foot-GELD. See the article FOOT-GELD.

Horn-GELD. See the article HORN-GELD.

Wood-GELD. See WOOD-GELD.

GELDERLAND, comprehending Zutphen, is a province of the united Netherlands, bounded by the Zuider-ſea and Overyſſel on the north, by Weſtphalia on the eaſt, by Brabant on the ſouth, and by the province of Utrecht on the weſt.

GELDER ROSE, the name by which ſome call the opulus, or water-elder.

GELDING, the operation of caſtiating any animal, particularly horſes.

This operation conſiſts in cutting out the teſticles; in performing which, three things are to be obſerved: firſt, regard is to be had to their age; next, to the ſeaſon of the year; and, laſtly, to the ſtate of the moon. For the firſt, if the operation is to be performed on a colt; he may be gelded at nine or at fifteen days old, if the teſticles be come down, in regard the ſooner he is gelt the better it will be for his growth, ſhape, and courage; though a horſe may be gelt at any age, if proper care be taken in the cure. As for the ſecond, the beſt time is about April or May, or elſe about the latter end of September. And for the third, the wane of the moon is the fitteſt time for performing this operation.

The manner of gelding is as follows: the beaſt being caſt down on ſome ſoft place, the operator takes the ſtones between his foremoſt and his great finger, and ſlitting the cod, preſſes the ſtones forth; then taking a pair of nippers, made very ſmooth, either of ſteel, box, or braſil-wood, he claps the ſtrings of the ſtones between them, very near to where the ſtones are ſet on, and preſſes them ſo hard, that there may be no flux of the blood; then, with a thin, drawing cauterizing iron, made red-hot, ſears away the ſtone.

This done, he takes a hard plaſter made of roſin, wax, and waſhed turpentine, well diſſolved together, and melts it on the head of the ſtrings: that being done, he ſears them, and melts more of the ſalve, till ſuch time as he has laid a good thickneſs of it upon the ſtrings.

This being done to one ſtone, the nippers are looſened, and the like is done to the other; and the two ſlits of the cod are then filled with white ſalt, and the outſide of the cod is anointed with hogs-greaſe; and thus they let him riſe, and keep him in a warm ſtable, without tying him up. If he ſwells much in his cods or ſheath, they chaſe him up and down; and make him trot an hour in a day, and he ſoon recovers.

The manner of gelding a hog is as follows: the operator, after having made two croſs ſlits, or inciſions, on the midſt of the ſtones, preſſes them out, and anoints the ſore with tar. But another more general method, yet ſomewhat more dangerous, if not well done, is firſt to cut the ſtone on the top, and after having drawn that one forth, the operator puts in his finger at the ſame ſlit, and, with a lancet, cuts the ſkin between the two ſtones, and by that ſlit preſſes out the other ſtone. Then having cleanſed out the blood, he anoints the part with freſh greaſe: and thus there is but one inciſion made in the cod. Boar-pigs ought to be gelt about ſix months old; yet they are commonly gelded about three weeks or a month old.

GELDING *of a lamb* may be performed from the age of three days to three weeks or more, in the following manner: one is to hold the lamb between his legs, or in his lap, and turn him on his back, holding his fore-feet upright together (but if any black ſpots are ſeen in his flank, he muſt not be cut at all), then the cutter holding the tip of the cod in his left hand, cuts the lap of it an inch quite away; which done, he, with the foremoſt fingers and thumbs of both hands, ſhould ſoftly ſlip down the cod over the ſtones, to the belly, and with his teeth, holding the left ſtone in his mouth, he draws it ſoftly out the length of the ſtring; after which he is to draw out the other ſtone in the ſame manner; then he ſpits in the cod, and anoints the lamb's flanks with freſh greaſe, and ſo lets him go, and keeps ſtirring him up and down for two or three hours.

GELDERS, a city of Gelderland, ſituated twenty-three miles ſouth of Nimeguen: eaſt longit. 6° 8′ and north lat. 51° 35′.

This city, with the territory about it, was yielded to the king of Pruſſia, by the treaty of Utrecht.

GELENHAUSEN, an imperial city of Germany, governed by its own magiſtrates; it is ſituated nine miles north of Hanau: eaſt longit. 8° 50′, and north lat. 50° 15′.

GELOSCOPY, a kind of divination drawn from laughter; or a method of knowing the qualities and character of a perſon, acquired from the conſideration of his laughter.

GEM, *gemma*, in natural hiſtory, a common name for all precious ſtones, of which there are two claſſes, the pellucid and ſemipellucid.

The bodies compoſing the claſs of pellucid gems are bright, elegant, and beautiful foſſils, naturally and eſſentially compound, ever found in ſmall detached maſſes, extremely hard, pellucid, and of great luſtre; compoſed of a very firm and pure matter, without any admixture of earthy ſubſtance, giving fire with ſteel, not fermenting with acid menſtruums, and very difficultly calcinable in the fire. Of this claſs there are two genera, the chroſtaſima, and the chroaſtaces. See Chrostasima and Chroastaces.

The bodies compoſing the claſs of ſemipellucid gems, are ſtones naturally and eſſentially compound, not inflammable nor ſoluble in water, found in detached maſſes, and compoſed of cryſtalline matter, debaſed by earth: however, they are but ſlightly debaſed, and are of great beauty and brightneſs, of a moderate degree of tranſparency, and are uſually found in ſmall maſſes.

Of this claſs there are two orders: the firſt of which conſiſts of the ſemipellucid gems, of but two variegations, and frequently of one plain, ſimple colour; tho' ſometimes veined: this order contains four genera, *viz.* the ſardæ, the chalcedonies, the hydrophanæ, and the pramnion. See the articles Sarda, Chalcedony, Hydrophanæ, and Pramnion.

The ſecond order of ſemipellucid gems, conſiſting of thoſe remarkable for their veins, zones, and variegations, contains alſo four genera, *viz.* the achatæ, the onyches, the ſardonyches, and the cameæ. See the articles Achates, Onyx, Sardonyx, and Camæa.

Many authors, not only among the antients but the moderns, are full of the virtues and medicinal properties of precious ſtones; but their reputation, in this reſpect, is now not a little fallen. Yet as the fragments of ſuch ſtones are ſtill preſerved by the phyſicians in ſome of the moſt celebrated compoſitions, as there are certain chemical preparations made of them, as ſeveral perſons of the greateſt candour and experience have related many conſiderable effects of certain gems, on their own particular obſervations, and, laſtly, as it is no way improbable that ſome of the ſofter ſtones may have ſome conſiderable operations on the human body, it might be imprudent indiſcriminately to exclude from them any medicinal virtue at all. When much the greater part of their traditionary qualities are ſet aſide as fabulous, there will remain ſome on as real and well warranted a footing, as many of our other medicines.

On ſuch conſiderations the excellent Mr. Boyle was induced to give us that extraordinary piece of the origin and virtues of gems, the purport whereof is to ſhew, that ſuch ſtones were originally in a fluid ſtate, or are made up of ſuch ſubſtances as were formerly fluid; and that many of their general virtues are probably derived from the mixture of metalline and other mineral ſubſtances, uſually incorporated with them; while the great variety and the particular efficacy of their virtues, ariſe from ſome happy concurrent ſubſtances of that commixture, *e. g.* the peculiar nature of the impregnating liquor, the proportion wherein it is mixed with the petreſcent juice, and the like.

To ſupport this hypotheſis of the virtues of gems, he ſhews, that ſeveral of them are not ſimple concretions of any petreſcent liquors, but conſiſt alſo of other adventitious parts, which he argues from the ſeparableneſs of ſuch ſubſtances in ſome ſtones, the ſpecific gravity in others, and the different tinctures to be met with in gems of the ſame ſpecies. There may, therefore, be in ſome gems numberleſs adventitious corpuſcles; and there is reaſon to think, that ſome of theſe corpuſcles may be endued with ſeveral properties and medicinal virtues.

The ſtreſs of what is objected to them is this: the mineral ſubſtances they contain are ſo cloſely locked up, that they can communicate nothing to the body, and ſo can have no medicinal operation; being unconquerable by ſo ſmall a heat, as that of the ſtomach, and other parts of the body.

This objection might be plauſible enough to prevent the aſcribing any medicinal virtues to them, *a priori*, but can conclude nothing againſt what is warranted by ſo many facts and obſervations, eſpecially when there are ſeveral particulars that obviate this objection. For a vigorous loadſtone, though frequently harder than many gems, is known to emit copious effluvia; and there are many which have been found to have a manifeſt and inconvenient operation on the body, by being wore in the pocket, or long held in the hand.

" The hydroſtatical balance, ſays Mr. " Boyle, is of prime uſe in diſcerning " genuine gems from counterfeits, which " but too often paſs for true, to the " prejudice of phyſicians and their pa- " tients, and the loſs of lapidaries: for " as there are, perhaps, no qualities of " bodies more eſſential than their pon- " deroſity, ſo there is ſcarce any where- " in impoſtures find more difficulty to " make a notable alteration without be- " ing diſcovered." See the article HYDROSTATICAL BALLANCE.

Imitation or counterfeiting of GEMS *in glaſs.* The art of imitating gems in glaſs, is too conſiderable to be paſſed without notice; ſome of the leading compoſitions therein, we ſhall briefly mention upon the authority of Neri. See GLASS.

Theſe gems are made of paſtes, and are no way inferior to the native ſtones, when carefully made and well poliſhed, in brightneſs or tranſparency, but want their hardneſs. See the article PASTE.

The general rules to be obſerved in making the paſtes, are theſe. 1. That all the veſſels in which they are made be firmly luted, and the lute left to dry before they are put into the fire. 2. That ſuch veſſels be choſen for the work, as will bear the fire well. 3. That the powders be prepared on a porphyry-ſtone, not in a metal mortar, which would communicate a tinge to them. 4. That the juſt proportion in the quantity of the ſeveral ingredients be nicely obſerved. 5. That the materials be all well mixed, and if not ſufficiently baked the firſt time, to be committed to the fire again, without breaking the pot: for if this be not obſerved, they will be full of bliſters and air-bladders. 6. That a ſmall vacuity be always left at the top of the pot, to give room to the ſwelling of the ingredients.

To make paſte of extreme hardneſs, and capable of all the colours of the gems, with great luſtre and beauty. Take of prepared cryſtal, ten pounds; ſalt of polverine, ſix pounds; ſulphur of lead, two pounds; mix all theſe well together into a fine powder; make the whole with common water into a hard paſte; and make this paſte into ſmall cakes of about three ounces weight each, with a hole made in their middle; dry them in the ſun, and afterwards calcine them in the ſtraighteſt part of a potter's furnace. After this, powder them, and levigate them to a perfect fineneſs on a porphyry, and ſet this powder in pots in a glaſs-furnace to purify for three days: then caſt the whole into water, and afterwards return it into the furnace, where let it ſtand fifteen days, in which time all foulneſs and bliſters will diſappear, and the paſte will greatly reſemble the natural jewels. To give this the colour of the emerald, add to it braſs thrice calcined; for a ſea-green, braſs ſimply calcined to a redneſs; for a ſapphire, add zaffer, with manganeſe; and for a topaz, manganeſe and tartar. All the gems are thus imitated in this by the ſame way of working as the making of coloured glaſſes; and this is ſo hard, that they very much approach to the natural gems.

The colour of all the counterfeit gems made of the ſeveral paſtes, may be made deeper or lighter, according to the work for which the ſtones are deſigned; and it is a neceſſary general rule, that ſmall ſtones for rings, *&c.* require a deeper colour, and large ones, a paler: beſides the colours made from manganeſe, verdigreaſe, and zaffer, which are the ingredients commonly uſed, there are other very fine ones which care and ſkill may prepare. Very fine red may be made from gold, and one not much inferior to that from iron: a very fine green from braſs or copper; a ſky-colour from ſilver; and a much finer one, from the granates of Bohemia.

GEMARA, in jewiſh antiquity, a collection of deciſions and determinations on the law, wrote after the Miſna was completed.

It was called gemara, or perfection, becauſe it was conſidered as ſo perfect an explication of the law, that after it no farther additions could be made, or any thing more deſired. It is otherwiſe called the talmud. See TALMUD.

GEMATRIA, or GEMATRIE, in jewiſh antiquity. See the article CABBALA.

GEMBLOURS, a town of the auſtrian Netherlands, in the province of Brabant, ſituated on the river Orne, ten miles north-weſt of Namur: eaſt long. 4° 30′, and north lat. 50° 30′.

GEMELLUS, in anatomy, the name of two muſcles, both of which are ſmall, flat and narrow, and ſituated almoſt tranſverſely one above the other, between the tuberoſity of the iſchium and the great trochanter, immediately below the pyriformis, and parted by the tendon of the obturator internus.

The ſuperior and ſmalleſt gemellus is

fixed to the lower part of the ſpine of the iſchium, to the ſuperior part of the ſmall iſchiatic notch, and is continued under the acetabulum where it is bent downwards. The inferior and largeſt gemellus, is fixed to the ſuperior and back part of the tuberoſity of the iſchium, and bending upwards towards the other line, together with it forms a ſort of irregular ſemicircle.

GEMINATED COLUMN. See the article COLUMN.

GEMINI, the TWINS, in aſtronomy, one of the twelve ſigns of the zodiac, the third in order, beginning with aries. See the articles SIGN and ZODIAC.

This conſtellation, according to different authors, contains from 24 to 89 ſtars. It is repreſented by the figure of two twin-children, looking each other affectionately in the face, and ſuppoſed to be Caſtor and Pollux.

GEMMA, *gem*, in natural hiſtory. See the article GEM.

Sal GEMMÆ, is the pureſt and fineſt foſſile ſalt, and an extremely bright and beautiful foſſil. It is conſiderably hard and firm, and at leaſt as pellucid as rock cryſtal; but is frequently coloured throughout with a milky-white, which takes off greatly from its luſtre; and as cryſtal is liable to be tinged with red, green and yellow, ſo as to reſemble rubies, ſapphires, emeralds, and topazes, ſo this ſalt is ſometimes tinged with theſe ſeveral colours; but rarely preſerves the tranſparency of cryſtal under the ſame circumſtances. See the article SALT.

GEMONIÆ SCALÆ, in roman antiquity, a place for executing criminals, not unlike Tyburn with us. It was ſituated on the Aventine mount, or tenth region of the city; and was, according to ſome, a place raiſed on ſeveral ſteps, from whence they precipitated the criminals. But others will have it to have been a kind of dungeon, to which they deſcended by ſteps.

GEMUND, a town of Germany, in the circle of Weſtphalia, and dukedom of Juliers, ſituated on the river Roer: eaſt long. 6° 15′, and north lat. 50° 34′.

GEMUND, a town of Germany, in the circle of Swabia, and county of Rechſberg, ſituated on the river Rems: eaſt long. 9° 40′, and north lat. 48° 45′.

GEMUND, a town of Germany, in the circle of Franconia, ſituated on the river Maine: eaſt long. 9° 45′, and north lat. 50° 8′.

GENA, the CHEEK, in anatomy, that part of the face between the noſe and the ears. See the article FACE, &c.

GENÆ QUADRATUS. See QUADRATUS.

GENAP, a town of Brabant, ſituated on the river Dyle, 14 miles ſouth-eaſt of Bruſſels.

GENDARMES, or GENS D'ARMES, in the french armies, a denomination given to a ſelect body of horſe, on account of their ſucceeding the antient gendarmes, who were thus called from their being completely cloathed in armour.

The king's body guards, the light horſe of the royal houſe, and the muſqueteers, are at preſent reputed to belong to the gendarmerie.

The grand gendarmes are a troop compoſed of about 250 gentlemen, who guard the king's perſon. The king himſelf is their captain, and one of the prime peers their captain-lieutenant, who has under him two lieutenants, three enſigns, three guidons, and other officers. There are beſides theſe, gendarmes of the queen, the dauphin, &c.

GENDER, *genus*, among grammarians, a diviſion of nouns, or names, to diſtinguiſh the two ſexes. See NOUN and SEX.

This was the original intention of gender; but, afterwards, other words which had no proper relation, either to the one ſex or the other, had genders aſſigned them, rather out of caprice than reaſon; which is at length eſtabliſhed by cuſtom. Hence genders vary according to the languages, or even according to the words introduced from one language into another. Thus *arbor*, in latin, is feminine; but *arbre*, in french, is maſculine: and *dens*, in latin, is maſculine; but *dent*, in french, is feminine. Nay, a gender has ſometimes changed in the ſame language, according to time and occaſion. Thus *alvus*, according to Priſcian, was antiently maſculine, but afterwards became feminine; and *navire*, was antiently feminine in french, but is now maſculine. In engliſh we have no genders; indeed we expreſs the difference of ſex by different words; as boar, ſow; boy, girl, &c. We have alſo twenty-four feminines diſtinguiſhed from the males by varying the termination of the female into eſs; as actor, actreſs; prince, princeſs; heir, heireſs, &c. and we have a few words in which the feminine is diſtinguiſhed from the maſculines by the termination ix, as executor, executrix; adminiſtrator, adminiſtratrix, *&c.* which is all our language knows of any thing like genders.

The eaſtern languages as well as the vulgar languages of the weſt, have only two genders, the maſculine and the feminine. The greek and latin have beſides, the neuter, common, and doubtful gender. This laſt indeed is not common, for it properly belongs only to the names of ſome animals, which are promiſcuouſly joined both to maſculine and feminine adjectives, to expreſs their male or female, as bos, canis, ſus, *&c.* They have alſo the epicœne gender, which is not a different one, but ſerves promiſcuouſly for either; including both the kinds under one ſingle gender and termination: thus *vulpes*, a fox, tho' it ſignifies either the male or female, is really of the feminine gender, in latin. And ſo *cuſtodiæ*, watchmen or centinels, are really feminine, tho' they ſignify men. This is common to all languages that have them. The latin and greek, in the neuter gender, do not regard them, having no relation to the male or female ſex, but what fancy gives them, and the termination of certain words.

The oriental languages frequently neglect the uſe of genders; and the perſian language has none at all, which is no diſadvantage; the diſtinction of genders being entirely uſeleſs.

GENEALOGICA ARBOR, or tree of conſanguinity, ſignifies a genealogy or lineage drawn out under the figure of a tree, with its root, ſtock, branches, *&c.* The genealogical degrees are uſually repreſented in circles, ranged over, under, and aſide each other. This the Greeks called ſteminata, a word ſignifying crown, garland, or the like.

GENEALOGY, γενεαλογια, an enumeration of a ſeries of anceſtors; or a ſummary account of the relations and alliances of a perſon or family, both in the direct and collateral line.

GENEP, a town in the dutchy of Cleeve, in Germany, ſituated on the Nierſe and Maeſe, ten miles weſt of Cleeve: eaſt long. 5° 30′, and north lat. 51° 40′.

GENERAL, an appellation given to whatever belongs to a whole genus. See the article GENUS.

Thus we ſay, general geography, diet, council, averment, iſſue, *&c.* See the articles GEOGRAPHY, DIET, *&c.*

GENERAL OFFICERS, in the army. See the article OFFICER.

GENERAL TERMS, among logicians, thoſe which are made the ſigns of general ideas. See IDEA and ABSTRACTION.

All things that exiſt, Mr. Locke obſerves, being particulars, it might be expected that words ſhould be ſo too in their ſignification: but we find it quite contrary; for moſt of the words that make all languages are general terms. This is the effect of reaſon and neceſſity. For,

Firſt, It is impoſſible that every particular thing ſhould have a diſtinct name, becauſe it is impoſſible to have diſtinct ideas of every particular thing; to retain its name, with its peculiar appropriation to that idea.

Secondly, It would be uſeleſs, unleſs all could be ſuppoſed to have theſe ſame ideas in their minds. For names applied to particular things, whereof I alone have the ideas in my mind, could not be ſignificant or intelligible to another, who is not acquainted with all thoſe particular things which had fallen under my notice.

Thirdly, It would be of no great uſe for the improvement of knowledge: which, tho' founded in particular things, enlarges itſelf by general views, to which things reduced into ſorts under general names, are properly ſubſervient.

In things where we have occaſion to conſider and diſcourſe of individuals and particulars, we uſe proper names: as in perſons, countries, cities, rivers, mountains, *&c.* Thus we ſee that jockeys have particular names for their horſes, becauſe they often have occaſion to mention this or that particular horſe, when he is out of ſight.

Afterwards, obſerving that a great many things reſembling each other in ſhape, and other qualities, we frame a general idea that takes in only the qualities in which thoſe many particulars agree; and to this idea we give the name *man*, for example, in which there is nothing new; that which is peculiar to each individual being left out, and only what is common to all retained. And thus we come to have a general idea, and a general name. By the ſame method the mind proceeds to more general notions and names, as thoſe of animal, ſubſtance, being, thing, and ſuch univerſal terms as ſtand for any ideas whatſoever.

As to the ſignification of general words, it is evident they do not barely ſignify one particular thing; neither do they ſignify a plurality. But they ſignify a genus, kind, or ſort of things. See the article GENUS.

GENERAL *of an army*, in the art of war, he who commands in chief. See ARMY.

A general ought to be a man of great courage and conduct, to have great experience, and to be of good quality. His conduct appears in eſtabliſhing his magazines in convenient places; in examining the country, that he may not engage his troops too far, while he is ignorant of the means of bringing them off; in ſubſiſting them; and in knowing how to take the moſt advantageous poſts, either for fighting or ſhunning a battle. His experience inſpires his army with confidence, and an aſſurance of victory; and his quality, by creating reſpect, augments his authority. By his liberality he gets intelligence of the ſtrength and deſigns of the enemy, and by this means is enabled to take the moſt ſucceſsful meaſures. A general ought likewiſe to be fond of glory, to have an averſion to flattery, to render himſelf beloved, and to keep a ſtrict diſcipline.

The office of a general is to regulate the march and encampment of the army; in the day of battle to chooſe out the moſt advantageous ground; to make the diſpoſition of the army; to poſt the artillery; and where there is occaſion, to ſend his orders by his aids de camp. At a ſiege, he is to cauſe the place to be inveſted; to order the approaches and attacks; to viſit the works, and to ſend out detachments to ſecure his convoys.

GENERAL *of horſe*, and GENERAL *of foot*, are poſts next under the general of the army, and theſe have upon all occaſions an abſolute authority over all the horſe and foot in the army.

GENERAL *of the artillery*, or *Maſter* GENERAL *of the ordnance*. See the article ORDNANCE.

GENERAL is alſo uſed for a particular march, or beat of drum; being the firſt which gives notice, commonly in the morning early, for the infantry to be in readineſs to march.

GENERAL is alſo uſed for the chief of an order of monks; or of all the houſes and congregations, eſtabliſhed under the ſame rule. Thus we ſay, the general of the Franciſcans, Ciſtercians, *&c.*

GENERATING LINE, or FIGURE, in geometry, is that by which its motion produces any other plane or ſolid figure. Thus, a right line moved any way parallel to itſelf, generates a parallelogram; round a point in the ſame plane, with one end faſtened in that point, it generates a circle. One entire revolution of a circle, in the ſame plane, generates the cycloid; and the revolution of a ſemi-circle round its diameter, generates a ſphere, *&c.* See the articles CYCLOID, SPHERE, *&c.*

GENERATION, *generatio*, in phyſiology, the act of procreating and producing a thing which before was not; or, according to the ſchoolmen, it is the total change or converſion of one body into a new one, which retains no marks of its former ſtate. Thus, we ſay, fire is generated, when we perceive it to be where before there was only wood, or other fuel: in the ſame manner, a chick is ſaid to be generated, when we perceive it where before there was only an egg; or, the egg is changed into the form of a chick.

In generation, there is not properly any production of new parts; but only a new modification, or manner of exiſtence, of the old ones.

When almighty God, ſays Dr. Blair, created the world, he ſo ordered and diſpoſed of the materies mundi, that every thing produced from it ſhould continue ſo long as the world ſhould ſtand. Not that the ſame individual ſpecies ſhould always remain; for they were in proceſs of time to periſh, decay, and return to the earth from whence they came; but that every like ſhould produce its like, every ſpecies produce its own kind, to prevent a final deſtruction of the ſpecies, or the neceſſity of a new creation. For which end he laid down certain regulations, by which each ſpecies was to be propagated, preſerved, and ſupported, till, in order and courſe of time, they were to be removed hence: for without that, thoſe very beings which were created at firſt, muſt have continued to a final diſſolution of all things; which almighty God of his infinite wiſdom, did not think fit. But that he might ſtill the more manifeſt his omnipotence, he ſet all the engines of his providence to work, by which one effect was to produce another, by means of certain laws or rules, laid down for the propagation, maintenance, and ſupport of all created beings. This his divine providence is called nature, and theſe regulations are called the laws or rules of nature, by which it ever operates in its ordinary courſe; and whatever recedes from that, is ſaid to be preternatural, miraculous, or monſtrous.

GENERATION *of animals.* According to Ariſtotle, the males contain the principle, and the females the matter of generation: for tho' both were furniſhed indeed, with a ſeminal liquor, yet the ſemen of the males alone was prolific. The moderns, on the other hand, as well thoſe who contend for the ſyſtem of generation from eggs, as they who adopt that of the animalcules in the male-ſeed, pretend that females have no ſuch ſeminal liquor at all, and that what was commonly taken for it was ſome other animal fluid.

There are great and many difficulties which attend the moſt plauſible account of the firſt formation of the parts of an animal, and the beginning of motion in its fluids: for though both reaſon and experience convince us, that all the parts of an animal did exiſt before generation; yet how this matter becomes to aſſume ſo very different a form, as that of an embryo, is by no means agreed on.

Harvey is of opinion, that all females are furniſhed with eggs, and that the embryoes, or young animals, are formed in the ſame manner as a chick in the egg of any bird. Generation, according to this celebrated phyſician, is effected wholly by means of the uterus, or womb; which conceives the fœtus by a kind of contagion communicated to it by the male-ſeed, much in the ſame way as the load-ſtone communicates magnetiſm to iron. This contagion, he thinks, acts not only on the uterus, but is communicated to the whole body of the female, which is altogether prolific; though the uterus, he acknowleges, is the only part that is capable of conceiving the fœtus, juſt as the brain is alone capable of forming ideas and notions. Agreeably to this doctrine of Harvey, Steno, and other anatomiſts, have pretended to diſcover certain eggs in the ovaries or teſticles of women; which Mr. Buffon denies to be the caſe, affirming, that there are no ſuch eggs to be found in the teſticles or ovaries of women.

We cannot enter into a detail of the reaſonings for and againſt the ſyſtem of generation from eggs, and ſhall therefore only obſerve, that its advocates pretend to have diſcovered eggs in all the females on which they made obſervations, that the largeſt of thoſe found in women did not exceed the bigneſs of a pea; that they are extremely ſmall in young girls under fourteen, but that age and commerce with men makes them grow larger; that there are more than twenty ſuch eggs in each ovary or teſticle; that they are fecundated in the ovary by the ſpirituous and volatile part of the male-ſeed; that they afterwards are detached and fall into the uterus through the fallopian tubes; that here the fœtus is formed of the internal ſubſtance of the egg, and the placenta of the exterior part. See the article **FOETUS.**

Leewenhoek is the author of another ſyſtem of generation, from animalcules in the male ſeed. He tells us, he diſcovered many thouſands of theſe in a drop leſs than a grain of ſand. They are found in the ſemen of all males whatever, but not in that of females; and are ſo ſmall, that 3,000,000,000 of them are not equal to a grain of ſand, whoſe diameter is but the hundredth part of an inch. When any of theſe animalcules gets into an egg, fit to receive it, and this falls into the womb through the fallopian tubes, the humours which diſtil through the veſſels of the womb, penetrating the coats of the egg, ſwell and dilate it, as the ſap of the earth does ſeed thrown into it. The placenta begins to appear like a little cloud, upon one ſide of the external coat of the egg; and, at the ſame time, the ſpine of the embryo-animalcule is grown ſo big, as to become viſible; and a little afterwards, the cerebrum and cerebellum appear like two bladders; and the eyes ſtand next goggling out of the head; then the beating of the heart or punctum ſaliens, is plainly to be ſeen; and the extremities diſcover themſelves laſt of all.

Theſe animalcules are of different figures, ſome like tadpoles, and others like eels. In the ſemen of a man, and in that of a dog, there have been diſcovered two different kinds of them, the one ſuppoſed to be males, and the other females. Some even pretend to have ſeen animalcules diſengage themſelves from the membranes that ſurround them; and that they then appeared perfectly like men, with legs, arms, &c. like thoſe of the human body.

All the advocates for the ſyſtem of generation from animalcules ſtrongly oppoſe that from eggs. They contend, that theſe animalcules cannot be looked upon as the inhabitants of the ſemen, ſince they were of greater extent than the liquor itſelf, not to mention that no ſuch animals are found in any other liquors of the body; and ſince females have nothing ſimilar to theſe animals, they think it manifeſt that the prolific principle reſides in males. When they are aſked, to what purpoſe ſerves ſuch an immenſe profuſion of human animalcules, they anſwer, that it is agreeable to the ordinary courſe of nature, both in the animal and vegetable part of the creation. They likewiſe ſtrengthen their ſyſtem, by alledging the many examples we have of ſimilar transformation in the inſect-claſs of animals, which, from caterpillars and ſmall worms, become winged animals of the butterfly, or fly kinds.

By this ſyſtem, ſays Mr. Buffon, the firſt woman cannot be ſaid to have contained the whole race of mankind, as being all, according to it, the true poſterity of the firſt man, and in their animalcule-ſtate contained only in him. On this principle, he proceeds to invalidate the ſyſtem of generation from animalcules: for ſuppoſing the ſize of a man to be 1, then will that of one of the ſpermatic animalcules be $\frac{1}{1000000000}$; and as a man is to an animalcule of the firſt generation in the ſame ratio that this animalcule is to an animalcule of the ſecond generation, it follows that this laſt will be expreſſed by the fraction $\frac{1}{1000000000000000000}$. In this manner he computes the ſize of the animalcules of ſeveral generations, all ſuppoſed to be living animals, notwithſtanding that their minuteneſs exceeds the power of imagination to conceive; and then tells us, that the ſyſtem of generation from eggs is liable to the ſame objections, whereof the detail may be ſeen in his Hiſt. Natur. tom. 2. p. 157, & ſeq.

As to Buffon's own ſyſtem, he thinks that every part, both of animals and vegetables, contains an infinite number of organic molecules; that theſe molecules aſſume ſucceſſively different forms, and are put into different motions, according to the circumſtances they are in; but that they are much more numerous in the ſeminal liquors of both ſexes, and the ſeeds of plants, than in other parts; that theſe organic molecules make the matter of nutrition; that this matter is always active, and tends to organization, forming itſelf into different ſhapes, according to the moulds it meets with. When the quantity of this organic matter is but ſmall, as in man, and moſt large animals, generation only takes place at the age of maturity, and even then the number of animals produced is but ſmall. The caſe is juſt the reverſe in animals, which abound with this matter, as in fiſhes and moſt birds.

With reſpect to the generation of mankind, the ſame author thinks it a certain fact, that the male-ſeed is received into the womb of the woman; and that, for this purpoſe, it is highly probable the internal orifice opens during the act of coition. The female-ſeed alſo makes its way into the womb, where being mixed with that of the male, they both together contribute to the formation of the fœtus; which is either male or female, according as the ſeed of the man or woman abounds moſt with organic molecules; and the infant reſembles either the father or mother, according to the different combinations of theſe molecules. Both theſe ſeminal liquors he thinks equally active in the formation of the fœtus, and that they fix and counterbalance each other; the molecules of each parent being thereby determined to form ſimilar parts to thoſe of the individual that furniſhed them, as the head, trunk, arms, legs, &c. He thinks the molecules proceeding from the genital parts fix themſelves firſt; and that the other molecules arrange themſelves ſucceſſively round theſe, in the ſame order which they before occupied in the parent. When a great quantity of the ſeminal liquors of both ſexes is received into the womb, there are formed different ſpheres of attraction, in different parts of theſe liquors; the conſequence of which is, that ſeveral fœtuſes are formed at the ſame time. See VEGETATION.

Nearly a-kin to Mr. Buffon's ſyſtem is that of Mr. Maupertuis, which he has explained in his Venus Phyſique. He obſerves, that all the variety, obſervable among mankind, may have been accidental at firſt; but being once eſtabliſhed in the conſtitution of the parents, they become natural to their poſterity. To illuſtrate this, he gives an inſtance of a ſexdigitary family at Berlin, who had ſix fingers, or ſix toes, and frequently both; and that this peculiarity was tranſmitted equally by the father and mother, but was loſt by alliances with thoſe who had but the uſual number of fingers or toes.

He farther obſerves, that moſt animals, excepting mankind, have ſtated ſeaſons for procreation, and that the females go with young ſome a longer, others a ſhorter time. Mares go from eleven to twelve months; cows and hinds go nine months, as do alſo women; foxes and wolves, five months; and bitches go only ſeven weeks; cats nine weeks; and rabbits but thirty-one days. Moſt birds are hatched in twenty one days; the canary birds, and ſome others, are hatched in thirteen or fourteen days. It appears, therefore, that there is an endleſs variety in the time and manner of the generation of animals.

Thoſe who deſire a more full account of theſe ſyſtems of generation may conſult Harvey, Leewenhoek, Buffon, *&c.*

Parts of GENERATION. The parts of generation, in men, are the teſticles, vaſa deferentia, veſiculæ ſeminales, and penis. See the article TESTICLE, *&c.* Thoſe, in women, are the pudendum or vulva, the clitoris, nymphæ, vagina, uterus or womb, ovaries, and fallopian tubes.

Equivocal GENERATION. See the article EQUIVOCAL.

GENERATION *of fiſhes.* The opinion of moſt naturaliſts, that the female fiſhes firſt depoſit their ſpawn, and that the males afterwards eject the ſemen upon it, is denied by Linnæus; who thinks it impoſſible, that the eggs of any animal ſhould be impregnated out of its body. He thinks it much more probable, that the males always eject their ſemen ſome time before the females depoſite their ſpawn; and that by ſwallowing this ſemen, the ſpawn is impregnated in the body of the fiſh. Nay, he tells us, that he himſelf ſaw three or four females, in the ſpawning time, gather about the male, and greedily ſwallow the ſemen he ejected. This he obſerved in ſome ſpecies of the eſox, pearch, and eſpecially the cyprinus; but he recommends farther enquiry to be made on this ſubject.

GENERATION *of inſects*, no leſs than that of birds, is now certainly known to be from eggs; which the female depoſits in places, where, at a proper ſeaſon, they are hatched into animals like their parents; or into maggots or worms, which, after ſeveral transformations, at laſt appear in the form of their parents.

Extraordinary GENERATION. Such is that of polypes, from cuttings or pieces of another polype. See POLYPE.

GENERATION *of plants.* The impregnation of the female palm-tree by the male, has been known in the moſt antient times. Herodotus, the father of hiſtory, tells us, that the Greeks called ſome of theſe trees male, the fruit of which they bound to the other kind, which bears dates; that the ſmall flies, wherewith the male abounded, might aſſiſt in ripening the fruit of the female tree. The remote age in which Herodotus wrote, ſufficiently apologizes for his believing, that what was really brought about by the farina fœcundans of the male-flower, was to be attributed to the inſects frequently found therein, and which perhaps frequently carry this farina from the male to the female. The proceſs of impregnation, according to Theophraſtus, was this: while the male plant was in flower, they cut off a branch of theſe flowers, and ſcattered the duſt and down therein upon the flowers of the female plant; by which means the female did not caſt her fruit, but preſerved them to maturity. This has been lately verified at Berlin, where a female palm-tree bore fruit for many years; but the fruit never ripened, and when planted did not vegetate, merely becauſe there was no male-palm in the place; for having procured a branch of male flowers from Leipſic, twenty German miles from Berlin, they ſuſpended it over the female flowers of their tree; and the experiment ſucceeded ſo well, that the female tree produced more than an hundred perfectly ripe fruit; and the experiment being repeated, it bore above two thouſand ripe fruit, which being planted produced young trees.

It is in the flowers of vegetables only, that the parts ſubſervient to generation are produced; and theſe flowers are either male, female, or hermaphrodite. Male-flowers are thoſe poſſeſſed of the organs of generation, analogous to the male parts of animals: ſuch are the ſtamina and apices, called by Linnæus, filaments and antheræ. The female flowers are only endowed with parts like thoſe, which perform the office of generation in females; and theſe are the piſtil and its appurtenances, which Linnæus divides into three parts, the germen, ſtyle, and ſtigma. The hermaphrodite flower, which conſtitutes the great bulk of the vegetable creation, is poſſeſſed of all theſe parts in itſelf, and is therefore capable of propagating its ſpecies without any foreign aſſiſtance; which, by many inconteſtible experiments, it has been found neither the male nor female flower ſimply is able to do. The impregnation of hermaphrodite flowers, may be performed within their own calyx; but, before a ſeparate female flower can be ſo, the farina fœcundans of the male flower muſt neceſſarily be conveyed to it thro' the circumambient air; which is the reaſon, why the quantity of the produce of ſuch plants is much more precarious, than that of plants which have hermaphrodite flowers: for if, during the flowering of theſe ſeparate male and female plants, the weather proves either very wet or ſtormy, their produce of fruit will be very inconſiderable, from the ſpoiling or haſty diſſipation of the male farina. Thus, independant of froſts, the fruit of the nut and filbert-tree, will be moſt numerous in thoſe years, in which the months of January, and February are the leaſt ſtormy and wet, becauſe at that time their flowers are produced. For the ſame reaſons, a ſtormy or wet May deſtroys the cheſnuts; and the ſame weather, in July, prodigiouſly leſſens the crop of maiz, or indian corn, as its ſpikes of male-flowers ſtand lofty, and at a conſiderable diſtance from the female.

Some of the more ſkilful modern gardeners put in practice, with regard to melons and cucumbers, the very method mentioned by Theophraſtus two thouſand years ago, in regard to the palm-tree. As theſe plants, early in the ſeaſon, are in this climate confined to frames and glaſſes, the air in which they grow is more ſtagnant than the open air; whereby the diſtribution of the farina fœcundans, ſo neceſſary towards the production of the fruit for the propagation of the ſpecies, is much hindered. To obviate the inconvenience thence ariſing, they collect the male-flowers when fully blown; and preſenting them to the female ones by a ſtroke of the finger, they ſcatter the farina fœcundans therein, which prevents the falling of the fruit before it is ripe.

By far the greater part of plants produce hermaphrodite flowers; but ſome there are which have ſeparate male and female-flowers growing from the ſame root, as maiz, nettles, box, elm, birch, oak, beech, hazel, hornbeam, plane-tree, pine, fir, cypreſs, cedar, melons, cucumbers, gourds, and ſeveral others: in many of theſe, the male and female flowers ſtand at a conſiderable diſtance. There are other plants which produce thoſe neceſſary organs upon different roots, as the palm-tree, hops, the willow-tree, miſletoe, ſpinach, hemp, poplar, french and dog's mercury, the yew-tree, juniper, and ſeveral others. Among theſe, the valiſnieria of Linnæus, as to the manner in which its male-flower impregnates the female, is one of the moſt ſingular prodigies in nature. It grows in rivulets, ditches, and ponds, in many parts of Europe. The male plant, which is continually covered with water, has a ſhort ſtalk, upon the top of which its flowers are produced. As this top never reaches the ſurface of the water, the flowers are thrown off from it and come unopened to the ſurface of the water; where, as ſoon as they arrive, by the action of the air, they expand themſelves, and ſwim round the female flowers, which are blown at the ſame time. Theſe laſt have a long ſpiral foot-ſtalk, by which they attain the ſurface of the water, and remaining there in flower a few days, are impregnated by the male-flowers detached from the ſtalk at the bottom.

It is obſervable, that the operations of nature are carried on moſt uſually by certain general laws, from which however ſhe ſometimes deviates. Thus almoſt all plants have either hermaphrodite flowers, or male and female flowers, growing from the ſame root, or male and female flowers from different roots; but there are a few of another claſs, which from the ſame root furniſh either male and hermaphrodite flowers, or female and hermaphrodite ones: of this kind are the bulberry tree, the muſa or plantain tree, white hellebore, pellitory, arrach, the aſh-tree, and a few others. *Watſon*, in Phil. Tranſ. Vol. 47. p. 169—183.

Some object to this theory of the generation of plants, from having obſerved ſome plants, which were termed female, growing ſingly; and though at a very great diſtance from any male plants of the ſame kind, producing perfect fruits, which grew when ſown. Mr. Miller tells us, he himſelf was ſtaggered in his opinion, on having obſerved a female plant of white briony, which grew ſingly in a garden, where there were no other plants of the ſame kind; which nevertheleſs, for ſeveral years, produced berries, which grew and flouriſhed perfectly well. This put him upon examining the plant more carefully than he had done before, when a great many male-flowers were found intermixed with the female ones; and he adds, that he has frequently obſerved the ſame in many other plants, which are generally male and female in diſtinct plants, yet have ſometimes both ſexes on the ſame plant.

From what has been ſaid, it appears very plain, that the embryo of the female flower muſt be impregnated by the farina fœcundans, or male-duſt, in order to render the fruit perfect; but how, or in what manner, it is performed, is what we can only gueſs at; ſince in the generation of animals, our greateſt naturaliſts differ widely, as has been ſhewn above, in their opinions concerning the particular method how it is performed. If, ſays the reverend Dr. Hales, I may be allowed to indulge conjecture, I would propoſe it to the conſideration of naturaliſts, whether, from the manifeſt proof we have that ſulphur attracts air, a hint may not be taken to enquire whether this may not be the primary uſe of the farina fœcundans, to attract and unite with itſelf, elaſtic or other refined active particles. That this farina abounds with ſulphur, and that a very refined ſort, is probable from the ſubtile oil which chemiſts obtain from the chives of ſaffron: and if this be the uſe of it, was it poſſible that it could be more aptly placed than on the ſlender points of the ſtamina, where it might eaſily, with the leaſt breath of wind, be diſperſed in the air; thereby ſurrounding the plant, as it were, with an atmoſphere of ſublimed ſulphureous pounce? Theſe uniting with particles of air, may, perhaps, be inſpired at ſeveral parts of the plant, and eſpecially at the piſtil, and be thence conveyed to the capſula ſeminalis. And if to theſe united ſulphureous and aerial particles, we ſuppoſe ſome particles of light to be joined (for Sir Iſaac Newton has found that ſulphur attracts light ſtrongly); then the reſult of theſe three by far the moſt active principles in nature will be a punctum ſaliens, to invigorate the ſeminal plant: and thus we are at laſt conducted, by the regular analyſis of vegetable nature, to the firſt enlivening principle of their minuteſt origin. So much for the generation of plants, and the diſcovery of their different ſexes, upon which Linnæus has founded his ſyſtem of botany, at preſent ſo much and ſo well received. Whoever, therefore, would conſider, more minutely, the ſtructure of flowers, and the almoſt infinite variety of the number and diſpoſition of their parts, may conſult Linnæus's Philoſophia Botanica, lately publiſhed, where this ſubject is treated in a very copious and inſtructive manner.

But beſides this regular and natural generation, many plants may be propagated, by planting cuttings or ſlips of them in the earth. See CUTTINGS.

GENERATION *of metals*, by earthquakes. See the article EARTHQUAKE.

GENERATION *of ſtones*. See the article LITHOGENESIA.

GENERICAL NAMES, among philoſophers, the ſame with general terms. See the article GENERAL TERMS, ſupra.

GENERICAL NAME, in natural hiſtory, the word uſed to ſignify all ſpecies of natural bodies, which agree in certain eſſential and peculiar characters, and therefore all of the ſame family or kind; ſo that the word uſed as the generical name, equally expreſſes every one of them, and ſome other words expreſſive of the peculiar qualities of figures of each are added, in order to denote them ſingly, and make up what is called the ſpecific name. Thus the word roſa, or roſe, is the generical name of the whole ſeries of flowers of that kind, which are diſtinguiſhed by the ſpecific names of the red roſe, the white roſe, the apple roſe, *&c.* The ignorance of former ages in the true principles of natural hiſtory, has occaſioned the bodies, which are the objects of it, to be arranged into very unnatural ſeries under the name of genera; and theſe have been called by names as improper, as the characters they were diſtinguiſhed by. Linnæus has done a great deal in the exploding the bad generical names in botany, and Artedi has applied his rules about the formation of theſe names with very little difference to the ſubjects of ichthyology. See the articles BOTANY and ICHTHYOLOGY.

GENEROSA, among lawyers, the addition for a gentlewoman, who may quaſh any writ wherein ſhe is termed ſpinſter. See the article SPINSTER.

GENESIS, among mathematicians, ſignifies the formation or production of ſome figure or quantity. See GENERATING, ſupra.

GENESIS, among divines, a canonical book of the Old Teſtament, and the firſt of the pentateuch, or five books of Moſes. The Hebrews call it Bereſchith, or, In the beginning, theſe being the firſt words in the book. The Greeks gave it the name of Geneſis, from its beginning with the hiſtory of the creation of the world. It includes the hiſtory of two thouſand three hundred and ſixty-nine years, and beſides the hiſtory of the creation, contains an account of the original innocence and fall of man; the propagation of mankind; the riſe of religion; the general defection and corruption of the world; the deluge; the reſtoration of the world; the diviſion and peopling of the earth; and the hiſtory of the firſt patriarchs down to Joſeph, at whoſe death it ends.

It was eaſy for Moſes to be ſatisfied of the truth of what he delivers in this book, becauſe it came down to his time through a very few hands. For, from Adam to Noah, there was one man (Methuſelah) who lived to ſee them both: in like manner, from Noah to Abraham, Shem converſed with them both; as Iſaac alſo did with Abraham and Joſeph, from whom theſe things might eaſily be conveyed to Moſes by Amram, who was cotemporary with Joſeph. Moſes is ſuppoſed to have written this book, during his retirement in the land of Midian, before he conducted the Iſraelites out of Egypt.

GENET, GENNET, or JENNET, in the manege, denotes a ſmall ſized, well proportioned ſpaniſh horſe.

To ride *a la genette*, is to ride after the ſpaniſh faſhion, ſo ſhort, that the ſpurs bear upon the horſe's flank.

GENET is alſo the name of a kind of cat, bred in Spain, ſomewhat bigger than a weaſel, of a grey or black colour, but the fur of the black is the moſt valuable.

GENETHLIACI, in aſtrology, men who erect horoſcopes, or pretend to predict what will happen to perſons, from the ſtars which preſided at their birth. See the article HOROSCOPE.

Nothing can be more abſurd than this pretended ſcience, and yet there have been times when princes themſelves were greatly infatuated with theſe ſort of people. The aſſurance with which theſe cunning fellows predicted future events made them always find dupes, and even after they were expelled from Rome by a decree of the ſenate, they met with ſuch protection from the credulity of the people, that they ſtill continued unmoleſted in the city.

GENETHLIACUM, or GENETHLIAC POEM, verſes made on the birth of ſome prince, or other illuſtrious perſon, in which the poet, by a kind of prediction, promiſes him great advantages, great proſperity, and glorious victories.

The ſame name is alſo given to verſes of this kind, made on the birth of any perſon whatſoever.

GENEVA, a city near the confines of France and Switzerland, on the river Rhone, about ſixty miles north-weſt of Lyons: eaſt long. 6°, north lat. 46° 20′. Geneva is a fortified town, about two miles in circumference, ſituated at the weſt end of a lake ſixty miles long, and twelve broad, called the lake of Geneva. It is a republic, governed by a council of 200, and a ſenate of twenty-five members; and is ſaid to contain 30,000 inhabitants.

GENEVA, or GIN, among diſtillers, an ordinary malt-ſpirit, diſtilled a ſecond time, with the addition of ſome juniper-berries. See the article JUNIPER.

Originally, the berries were added to the malt in the grinding; ſo that the ſpirit thus obtained was flavoured with the berries from firſt, and exceeded all that could be made by any other method. At preſent, they leave out the berries entirely, and give their ſpirits a flavour by diſtilling them with a proper quantity of oil of turpentine; which, though it nearly reſembles the flavour of juniper-berries, has none of their valuable virtues.

GENEVIEVE, or *St*. GENEVIEVE'S DAY, a feſtival obſerved at Paris on the third of January, in honour of St. Genevieve, patroneſs of the city.

GENIAL, an epithet given by the pagans to certain gods who were ſuppoſed to preſide over generation.

The genial gods, ſays Feſtus, were earth, air, fire and water. The twelve ſigns, together with the ſun and moon, were ſometimes alſo ranked in the number.

GENICULI, among botaniſts, the knots or joints in the ſtalks of plants; whence they are denominated geniculate plants.

GENIOGLOSSI, in anatomy, two muſcles which lie immediately under the genio-hyoidæus,

hyoidæus. They ariſe fleſhy from the fore-part of the lower jaw internally, and inlarging themſelves, are inſerted in the root of the tongue. When theſe act, they pull the tongue forwards, and thruſt it out of the mouth.

GENIOHYOIDÆUS, in anatomy, is a muſcle which ariſes in the middle of the chin, above the mylohyoides, and near the ſynchondroſis of the jaw: its termination is in the baſe of the os hyoides.

GENIPA, in botany, a genus of the pentandria-monogynia claſs of plants, the flower of which conſiſts of a ſingle, rotated petal; its tube is very ſhort, and of a funnel-like ſhape; and the limb large, and divided into five deep ſegments. The fruit is a fleſhy berry, of an oval figure, ſmall at each end, truncated, and containing two cells, in which are a number of depreſſed - angulated ſeeds. See Plate CX. fig. 4.

GENIS, a town of Savoy, ſituated on the river Guier, twelve miles weſt of Chambery.

GENISTA, GREEN-WEED, or DYER's-WEED, a genus of the diadelphia-decandria claſs of plants, with papilionaceous flowers; and the fruit a roundiſh turgid, and unilocular pod, containing a ſingle kidney-like ſeed.

GENITAL, an appellation given to whatever belongs to the parts of generation. See the article GENERATION.

GENITAL GODS, *dii genitales*, in roman antiquity, the ſame with the indigetes. See the article INDIGETES.

GENITALIA, or GENITARIES, in anatomy, a name ſometimes given to the teſtes, or teſticles of man, on account of their office in generation. See the article TESTICLE.

GENITES, γενητεις, among the Hebrews, thoſe deſcended from Abraham, without any mixture of foreign blood.

The Greeks diſtinguiſhed by the name of genites ſuch of the Jews as were iſſued from parents, who, during the babyloniſh captivity, had not allied with any gentile family.

GENITIVE, in grammar, the ſecond caſe of the declenſion of nouns. The relation of one thing conſidered as belonging in ſome manner to another, has occaſioned a peculiar termination of nouns, called the genitive caſe: But in the vulgar tongues, they make uſe of a ſign to expreſs the relation of this caſe. In engliſh they prefix the particle *of*, in french *de*, or *du*, &c. Though in ſtrictneſs there are no caſes in either of theſe languages; inaſmuch as they do not expreſs the different relations of things by different terminations, but by additional prepoſitions, which is otherwiſe in the latin, *&c.* See the article CASE.

In the hebrew tongue, the genitive caſe is marked in a very different manner from that of the greek and latin; for whereas in thoſe languages the noun governed is varied, in the hebrew the noun governing undergoes the alteration. See the article HEBREW LANGUAGE.

GENIUS, a good or evil ſpirit, or dæmon, whom the antients ſuppoſed ſet over each perſon, to direct his birth, accompany him in life, and be his guard. See the article DÆMON.

The rank and office of the genii were inferior to thoſe of the lares; for the latter were the tutelar gods of a family, whereas the genii had the care or government only of ſingle perſons, or places. Apuleius following the ſentiment of Plato, gives the following account of the genii.

They are ſpirits who never were ingaged in matter, nor were ever joined to bodies. Of theſe genii Plato is of opinion that every man has his own, who watches over him, and is a witneſs not only of his actions, but of his very thoughts; and that, when the perſon dies, the genius conducts the ſoul of which he had the charge, to judgment, and aſſiſts at the trial: if the accuſed perſon falſifies, the genius convicts him; if he ſpeaks the truth, he confirms it; and it is upon his evidence that ſentence is pronounced. The antients not only aſcribed a genius to particular perſons, but to places likewiſe. They allowed a genius to provinces and towns, to foreſts, trees, fountains, and to the ſciences. Each perſon ſacrificed once a year to his genius, and ſcattered flowers, and ſprinkled wine to him: ſometimes they offered leaven or ſalted dough, or a pig two months old. It was commonly thought that each perſon had two genii attending him. Flattery introduced the cuſtom of ſwearing by the genius of the emperors, among the Romans, in the decline of that empire. Socrates's genius is famous in antiquity. The Mahometans pretend that the genii inhabited the world many thouſand years before Adam, under the reigns of ſeveral princes, who all bore the name of Solomon; but falling at length into a general corruption, Ebbi was ſent to drive them to a remote part of the earth, there to be confined; that ſome of that generation; ſtill remaining, they were by Talmurath, one of the antient kings of Perſia, who waged war againſt them, forced to retreat to the famous mountains of Kaf. See the article ANGEL.

GENIUS, in matters of literature, *&c.* a natural talent or diſpoſition to do one thing more than another; or the aptitude a man has received from nature to perform well and eaſily that which others can do but indifferently, and with a great deal of pains.

To know the bent of nature is the moſt important concern. Men come into the world with a genius determined not only to a certain art, but to certain parts of that art, in which only they are capable of ſucceſs. If they quit their ſphere, they fall even below mediocrity in their profeſſion. Art and induſtry add much to natural indowments, but cannot ſupply them where they are wanting. Every thing depends on genius. A painter often pleaſes without obſerving rules, whilſt another diſpleaſes though he obſerves them; becauſe he has not the happineſs of being born with a genius for painting.

A man born with a genius for commanding an army, and capable of becoming a great general by the help of experience, is one whoſe organical conformation is ſuch, that his valour is no obſtruction to his preſence of mind, and his preſence of mind makes no abatement of his valour. Such a diſpoſition of mind cannot be acquired by art: it can be poſſeſſed only by a perſon who has brought it with him into the world. What has been ſaid of theſe two arts, may be equally applied to all other profeſſions. The adminiſtration of great concerns, the art of putting people to thoſe employments for which they are naturally formed, the ſtudy of phyſic, and even gaming itſelf, all require a genius. Nature has thought fit to make a diſtribution of her talents among men, in order to render them neceſſary to one another; the wants of men being the very firſt link of ſociety: ſhe has therefore pitched upon particular perſons to give them an aptitude to perform rightly ſome things which ſhe has rendered impoſſible to others; and the latter have a greater facility granted them for other things, which facility has been refuſed to the former. Nature, indeed, has made an unequal diſtribution of her bleſſings among her children; yet ſhe has diſinherited none; and a man diveſted of all kinds of abilities, is as great a phænomenon as an univerſal genius.

From the diverſity of genius, the difference of inclination ariſes in men, whom nature has had the precaution of leading to the employments for which ſhe deſigns them, with more or leſs impetuoſity in proportion to the greater or leſſer number of obſtacles they have to ſurmount, in order to render themſelves capable of anſwering this vocation. Thus the inclinations of men are ſo very different, becauſe they follow the ſame mover, that is, the impulſe of their genius. This, as with the painter, is what renders one poet pleaſing, even when he treſpaſſes againſt rules; while others are diſagreeable, notwithſtanding their ſtrict regularity.

The genius of theſe arts, according to the abbé du Bos, conſiſts in a happy arrangement of the organs of the brain; in a juſt conformation of each of theſe organs; as alſo in the quality of the blood, which diſpoſes it to ferment, during exerciſe, ſo as to furniſh a plenty of ſpirits to the ſprings employed in the functions of the imagination. Here he ſuppoſes that the compoſer's blood is heated; for that painters and poets cannot invent in cool blood; nay, that it is evident they muſt be wrapt in a kind of enthuſiaſm when they produce their ideas. Ariſtotle mentions a poet who never wrote ſo well as when his poetic fury hurried him into a kind of frenzy. The admirable pictures we have in Taſſo of Armida and Clorinda, were drawn at the expence of a diſpoſition he had to real madneſs, into which he fell before he died. Do you imagine, ſays Cicero, that Pacuvius wrote in cold blood? No, it was impoſſible. He muſt have been inſpired with a kind of fury, to be able to write ſuch admirable verſes.

GENNET, or GENET. See GENET.

GENOA, a city and archbiſhop's ſee of Italy, and capital of the republic of the ſame name, is built on a ſtrand near the ſea, and riſes gradually to the top of a hill; the houſes, which are lofty and well built, riſing like the ſeats of a theatre, afford a fine proſpect from ſea. The harbour is large and deep, and the principal ſtreet, from one end to the other, reſembles a double row of palaces: eaſt long. 9° 30′, and north lat. 44° 30′.

This city, which is fortified by a double wall, is ſix miles round, and contains thirty pariſh churches, twenty colleges, and as many convents and religious houſes. The legiſlative authority is lodged in the great ſenate, conſiſting of the ſigniory and four hundred noblemen and principal citizens, elected annually out of the freemen. The ſigniory conſiſts of the doge and twelve other members, who hold their places two years. Four parts in five of the ſenate muſt agree to the enacting of laws. The doge is obliged to reſide in the palace the two years he is in office; and after they are expired, he retires to his own houſe, where his adminiſtration is either approved or condemned; and if the latter, he is proceeded againſt as a criminal.

The territories of the republic lie in the form of a creſcent, along the coaſt of the Mediterranean, extending 150 miles; but the country no where reaches above twenty miles from the ſea, and in ſome places not ten.

GENS D'ARMES. See GENDARMES.

GENTIAN, *gentiana,* in botany, a genus of the pentandria-digynia claſs of plants, the flower of which conſiſts of a ſingle petal, tubulated and imperforated at the baſe; and at the edge, divided into five ſegments, various in figure: the fruit is an oblong, cylindric, acuminated capſule, ſlightly bifid at the top, formed of two valves, and containing only one cell: the ſeeds are numerous and ſmall; the receptacles are two, and grow to the two valves of the capſule.

The root of this plant is large, remarkably tough, and of a firm texture. It is brought to us from Germany, where it is in many places cultivated as liquorice is amongſt us; and is to be choſen freſh, tough, of a middle ſize, free from the ſmall fibres, and well dried; tho' if it be ſcorched, it is to be rejected.

This root is one of the beſt ſtomachic bitters that the materia medica affords: it procures an appetite, and greatly aſſiſts digeſtion. But if we give credit to ſome authors, this is one of the leaſt of its virtues; they have recommended it as a febrifuge and an alexipharmic, and as the moſt certain remedy for the bite of a mad dog. On this occaſion it is not only recommended internally but externally, a cataplaſm made of venice-treacle and the powder of this root, being ordered to be applied to the wound. It is alſo ſaid to be a certain remedy for agues, and one of the beſt known medicines againſt the plague.

GENTILE, in matters of religion, a pagan, or worſhipper of falſe gods.

The origin of this word is deduced from the Jews, who called all thoſe who were not of their nation, by the name of גוים, gojim, *i. e.* gentes, which in the greek tranſlations of the Old Teſtament, is rendered by τα ἐθνη; in which ſenſe it frequently occurs in the New Teſtament, as in Matth. vi. 32. *All theſe things the nations or gentiles ſeek.* Whence the latin church alſo uſed gentes, in the ſame ſenſe as our gentiles, eſpecially in the New Teſtament. But the word gentes ſoon got another ſignification, and no longer meant all ſuch as were not Jews, but thoſe only who were neither Jews nor Chriſtians, but followed the ſuperſtitions of the Egyptians, Greeks, Romans, *&c.* In this ſenſe it continued among the chriſtian writers, till their manner of ſpeech, together with their religion, was publicly and by authority received in the empire, when gentiles, from gentes, came into uſe: and then both words had two ſignifications, *viz.* in treatiſes or laws concerning religion, they ſignified pagans, neither Jews nor Chriſtians: and in civil affairs, they were uſed for all ſuch as were not Romans.

GENTILE, *gentilis,* in the roman law and hiſtory, a name which ſometimes expreſſes what the Romans otherwiſe called barbarians, whether they were allies of Rome or not: but this word was uſed in a more particular ſenſe for all ſtrangers and foreigners not ſubject to the roman empire, in contradiſtinction to *provincialis,* or an inhabitant of a province of the empire.

The word is uſed in this ſenſe in the Greek, but was not introduced into this or the latin tongue, till after chriſtianity was eſtabliſhed; it being taken from ſcripture.

GENTLEMAN, a perſon of a noble birth, or deſcended of a family which has long borne arms.

Chamberlayne obſerves, that in ſtrictneſs, a gentleman is one whoſe anceſtors have been freemen, and have owed obedience to none but their prince; on which footing no man can be a gentleman but one who is born ſuch. But, among us, the term gentleman is applicable to all above yeomen; ſo that noblemen may be properly called gentlemen. In our ſtatutes, *gentilis homo* was adjudged a good addition for a gentleman, 27 Edw. III. The addition of knight is very antient, but that of eſquire or gentleman was rare before 1 Hen. V.

GENTLEMAN *uſher of the black rod.* See the article ROD.

GENTLEMEN *of the chapel,* officers whoſe duty and attendance is in the royal chapel, being in number thirty-two, whereof twelve are prieſts; the other twenty, commonly called clerks of the chapel, aſſiſt in the performance of divine ſervice. One of the firſt twelve is choſen for confeſſor of the houſhold, whoſe office it is to read prayers every morning to the houſhold ſervants, to viſit the ſick, examine and prepare communicants, and adminiſter the ſacrament.

One of the twenty clerks, well verſed in muſic, is choſen firſt organiſt, who is maſter of the children, to inſtruct them in muſic, and whatever elſe is neceſſary for the ſervice of the chapel; a ſecond is likewiſe an organiſt; a third, a lutaniſt; and a fourth, a violiſt.

There are likewiſe three vergers, ſo called from the ſilver rods they carry in their hands; being a ſerjeant, a yeoman, and groom of the veſtry; the firſt attends the dean and ſub-dean, and finds ſurplices and other neceſſaries for the chapel; the ſecond has the whole care of the chapel, keeps the pews, and ſeats the nobility and gentry; the groom has his attendance within the chapel-door, and looks after it.

GENTLEMEN PENSIONERS. See the article PENSIONER.

GENUFLEXION, among eccleſiaſtical writers, the poſture of kneeling, a very antient cuſtom in acts of devotion; though the Ruſſians are ſaid to eſteem it indecent, and even the diſſenters, among us, prefer that of ſtanding.

GENUS, among metaphyſicians and logicians, denotes a number of beings, which agree in certain general properties, common to them all; ſo that a genus is nothing elſe but an abſtract idea, expreſſed by ſome general name or term. See the articles ABSTRACTION and GENERAL TERMS.

It is plain, therefore, that by a genus we do not barely ſignify one particular thing, nor yet a plurality of things; but a ſort or kind of things, all agreeing in certain general properties.

Thus animal is ſaid to be a genus in reſpect of man and brute, in regard man and brute agree in the common nature and character of animal: ſo a right lined figure of four ſides, is a genus in reſpect of a parallelogram, and a trapezium; and ſo likewiſe is ſubſtance, in reſpect of ſubſtance extended, which is body; and thinking ſubſtance, which is mind.

The method by which the mind advances to form genera is, according to Mr Locke, as follows. Obſerving ſeveral things that differ from the mind's idea of man, for inſtance, and therefore cannot be comprehended under that name, to agree with man in ſome certain qualities by retaining only thoſe qualities, and uniting them into one idea, it gets another more general idea, to which giving a name, it makes a new genus, or a term of a more comprehenſive extenſion. Thus by leaving out the ſhape, and other properties ſignified by the word man, and retaining only a body with life, ſenſe, and ſpontaneous motion, we form the idea ſignified by the name animal. By the ſame way the mind proceeds to body, ſubſtance; and at laſt to being, thing, and ſuch univerſal terms as ſtand for any ideas whatever.

This ſhews the reaſon why, in defining things, we make uſe of the genus, namely, to ſave the labour of enumerating the ſeveral ſimple ideas which the next term ſtands for: from whence it appears, that genus is no more than an abſtract idea comprehending a greater or leſs number of ſpecies, or more particular claſſes. See the article SPECIES.

Genus and ſpecies themſelves are the workmanſhip of human underſtanding; though it is not denied that nature, in making things alike, lays the foundation of this ſorting and claſſing, ſo that every diſtinct, abſtract idea, is a diſtinct eſſence: whence in the ſchools, the word eſſence has been almoſt wholly applied to the artificial conſtitution of genus and ſpecies. See the article ESSENCE.

In the ſeries of notions riſing one above another in the degree of univerſality, that diviſion which comprehends under it ſeveral genera, is called in the ſchools the higher genus, which denomination continues until we arrive at the laſt advance of the underſtanding; when being come to the moſt general of all ideas that admit not of a ſuperior, it is diſtinguiſhed by the name of the genus generaliſſimum. In like manner, the ſeveral genera comprehended under a higher genus,

nus, are in reſpect of it conſidered as ſpecies; and as theſe laſt too have ſpecies under them, the inferior diviſions are, for diſtinction's ſake, termed lower ſpecies. Thus the progreſſion continues, and when we come to the loweſt ſub-diviſion of all, comprehending only individuals, we call this the ſpecies ſpecialiſſima. All that lie between this and the higheſt diſtribution of things are the intermediate genera and ſpecies, which are termed each in their turn genus generalius, or ſpecies ſpecialior, according as we conſider them in the aſcending or deſcending ſcale of our ideas; or, to ſpeak in the language of logicians, according to their aſcent or deſcent in linea prædicamentali.

GENUS is alſo uſed for a character or manner applicable to every thing of a certain nature or condition: in which ſenſe it ſerves to make capital diviſions in divers ſciences, as muſic, rhetoric, anatomy, and natural hiſtory.

GENUS, in muſic, by the antients called *genus melodiæ*, is a certain manner of dividing and ſub-dividing the principles of melody; that is, the conſonant and diſſonant intervals, into their concinnous parts.

The moderns conſidering the octave as the moſt perfect of intervals, and that whereon all the concords depend, in the preſent theory of muſic, the diviſion of that interval is conſidered as containing the true diviſion of the whole ſcale. See the articles SCALE and OCTAVE.

But the antients went to work ſomewhat differently: the diateſſaron, or fourth, was the leaſt interval which they admitted as concord; and therefore they ſought firſt how that might be moſt conveniently divided: from whence they conſtituted the diapente and diapaſon.

The diateſſaron being thus, as it were, the root and foundation of the ſcale, what they call the genera, or kinds, aroſe from its various diviſions; and hence they defined the genus *modulandi* the manner of dividing the tetrachord, and diſpoſing its four ſounds as to ſucceſſion.

The genera of muſic were three, the enharmonic, chromatic, and diatonic: the two firſt were variouſly ſubdivided, and even the laſt, though that is commonly reckoned to be without any ſpecies; yet different authors have propoſed different diviſions under that name, without giving any particular names to the ſpecies, as was done to the other two.

For the characters, &c. of theſe ſeveral genera, ſee the articles ENHARMONIC, CHROMATIC, and DIATONIC.

GENUS, in rhetoric. Authors diſtinguiſh the art of rhetoric, as alſo orations or diſcourſes produced thereby, into three genera or kinds, demonſtrative, deliberative, and judiciary.

To the demonſtrative kind belong panegyrics, genethliacons, epithalamiums, funeral harangues, &c. See the articles PANEGYRIC, &c.

To the deliberative kind belong perſuaſions, diſſuaſions, commendations, &c. To the judiciary kind belong defences and accuſations. See the articles RHETORIC, ORATION, &c.

GENUS, in algebra. The antient algebraiſts divided that art into two genera or kinds, *viz.* the logiſtic and ſpecious. See LOGISTIC and SPECIOUS.

GENUS, in anatomy, the genus nervoſum, or nervous kind; or, as others term it, the nervous ſyſtem, is an expreſſion pretty frequent among anatomiſts, ſignifying the nerves conſidered as an aſſemblage or ſyſtem of ſimilar parts, diſtributed throughout the body. See NERVES.

GENUS, in natural hiſtory, a ſub-diviſion of any claſs or order of natural beings, whether of the animal, vegetable, or mineral kingdoms, all agreeing in certain common characters.

The genera of animals ought to be eſtabliſhed upon the moſt natural obvious, and diſtinctive characters. Thus it would be abſurd to range the ox and hog under the ſame genus, notwithſtanding they have both divided hoofs; and it would be equally ſo to make the roe-deer, rain deer, and elk, belong to different genera, merely becauſe the figure of their horns differs conſiderably. Hence the characters of the genera of animals are to be taken from the figure, ſituation, number, and proportions of their parts; which conſtitute ſuch a reſemblance, as eaſily diſtinguiſh them from the ſpecies of any other genus.

In the claſs of quadrupeds, beſides a general reſemblance, the different genera are diſtinguiſhed from each other by the number and figure of their teeth, the ſhape of their feet, horns, and the like. See the article QUADRUPEDS.

In the claſs of birds, the generical characters are drawn from the ſhape of their beak, and the number and diſpoſition of their toes. See the article BIRD.

In the claſs of amphibious animals, the generical characters are founded on the number of the cruſts or ſcales on the bellies and tails of the ſerpent-kind, and on the figure of the tail, and the number and ſhape of toes in the lizard, frog, and tortoiſe-kinds. See the articles SERPENT, LIZARD, *&c.*

As to the genera of fiſhes, they are founded on a certain agreement between a number of ſpecies, ariſing from the ſimilitude of their eſſential external parts; which always conſiſt in the ſituation of theſe parts, for the moſt part alſo in their number, and frequently in their figure and proportion.

The inſect-claſs are diſtinguiſhed into genera, from the number, figure, *&c.* of their antennæ, feet, ſnout, *&c.*

And the animalcules, as mentioned under the article ANIMALCULE.

With reſpect to the vegetable kingdom, all plants and trees are reduced to genera from the conſideration of the number, ſituation, figure, and proportion of the parts of fructification. See the article FRUCTIFICATION.

In the ſame manner, the genera of foſſils are eſtabliſhed upon the figure, hardneſs, conſiſtence, inflammability, and other obvious properties of the ſubſtances that compoſe the mineral kingdom. See the article FOSSIL.

GEOCENTRIC, in aſtronomy, is applied to a planet or its orbit, to denote it concentric with the earth, or as having the earth for its center, or the ſame center with the earth. See the articles EARTH and PLANET.

GEOCENTRIC *latitude of a planet*, is its diſtance from the ecliptic as it is ſeen from the earth, which, even though the planet be in the ſame point of her orbit, is not conſtantly the ſame, but alters according to the poſition of the earth in reſpect to the planet. For let B A T *t* (plate CXIII. fig. 2.) be the orbit of the earth, P N *n* the orbit of the planet, which ſuppoſe to be at P; from which let fall on the plane of the ecliptic the perpendicular P E. In whatever part of her orbit the earth is, this line P E will always ſubtend the angle which meaſures the geocentric latitude of the planet. Suppoſe, therefore, the earth at T, and venus in P, where ſhe comes neareſt to the earth, in which poſition venus is ſeen in her inferior conjunction with the ſun, and her geocentric latitude is meaſured by the angle P T E. But if venus ſhould be in the ſame ſituation, P, and the earth were at *t*, and from thence venus were obſerved in her ſuperior conjunction with the ſun, where ſhe is at her greateſt diſtance from us, her geocentric latitude would be anſwerable to P *t* E, which is much leſs than the angle P T E, becauſe the diſtance P *t* is greater than P T.

What we have here ſaid of the latitude of venus, is likewiſe true of that of mercury, and upon the ſame account. See HELIOCENTRIC and LATITUDE.

GEOCENTRIC *place of a planet*, the place wherein it appears to us from the earth, ſuppoſing the eye there fixed: or it is a point in the ecliptic to which a planet ſeen from the earth is referred.

GEODÆSIA, the ſame with ſurveying. See the article SURVEYING.

GEODES, in natural hiſtory, a genus of ſiderochita, conſiſting of cruſtated bodies, incloſing a ſmall quantity of earthy or arenaceous matter. See SIDEROCHITA.

Of this genus are the following known ſpecies. 1. The cracked geodes, with ferrugineous, brown, and yellow cruſts. 2. The wrinkled geodes, with ferrugineous, reddiſh, brown, and gold-yellow cruſts. 3. The ſparkling geodes, with ferrugineous, purpuliſh, and orange-coloured cruſts. 4. The long ſcabrous geodes, with a ſingle purpuliſh cruſt. And 5. The long geodes, with a ſingle blackiſh cruſt.

GEOGRAPHICAL MILE, the ſame with the ſea-mile; being one minute, or the ſixtieth part of a degree of a great circle on the earth's ſurface.

GEOGRAPHY, the doctrine or knowledge of the terreſtrial globe; or the ſcience that teaches and explains the properties of the earth, and the parts thereof which depend upon quantity.

Geography, as defined by Varenius, is that part of mixt mathematics, which explains the ſtate of the earth, and of its parts depending on quantity, *viz.* its figure, place, magnitude, and motion, with the celeſtial appearances, *&c.* In conſequence of this definition, that author divides geography into general and ſpecial, or univerſal and particular.

By univerſal geography, is underſtood that part of the ſcience which conſiders the whole earth in general, and explains its properties without regard to particular countries. This diviſion is diſtinguiſhed into three parts, abſolute, relative, and comparative. The abſolute part reſpects the body of the earth itſelf, its parts and peculiar properties, as its figure, magnitude, and motion; its lands, ſeas, and rivers, *&c.* The relative part accounts for the appearances and accidents that happen to it from celeſtial cauſes; and, laſtly, the comparative contains an explanation of thoſe properties which ariſe from comparing different parts of the earth together.

Special or particular geography, is that diviſion of the ſcience which deſcribes the conſtitution and ſituation of each ſingle country by itſelf; and is twofold, *viz.* chorographical, which deſcribes countries of a conſiderable extent; or topographical, which gives a view of ſome place, or ſmall tract of the earth. See the articles CHOROGRAPHY and TOPOGRAPHY.

Hence the object or ſubject of geography is the earth, eſpecially its ſuperficies and exterior parts.

The properties of geography, according to the ſame writer, are of three kinds, *viz.* celeſtial, terreſtrial, and human. The celeſtial properties are ſuch as affect us by reaſon of the apparent motion of the ſun and ſtars. Theſe are eight in number. 1. The elevation of the pole, or the diſtance of a place from the equator. 2. The obliquity of the diurnal motion of the ſtars above the horizon of the place. 3. The time of the longeſt and ſhorteſt day. 4. The climate and zone. 5. Heat, cold, and the ſeaſons of the year; with rain, ſnow, wind, and other meteors. 6. The riſing, appearance and continuance of the ſtars above the horizon. 7. The ſtars that paſs through the zenith of a place. 8. The celerity of the motion with which, according to the copernican hypotheſis, every place conſtantly revolves. See the articles ELEVATION, POLE, *&c.*

The terreſtrial properties are thoſe obſerved in the face of each country, and are ten in number. 1. The limits and bounds of each country. 2. Its figure. 3. Its magnitude. 4. Its mountains. 5. Its waters, *viz.* ſprings, rivers, lakes, and bays. 6. Its woods and deſarts. 7. The fruitfulneſs and barrenneſs of the country, with it various kinds of fruits. 8. The minerals and foſſils. 9. The living creatures there. 10. The longitude and latitude of the place.

The third kind of obſervations to be made in every country is called human, becauſe they chiefly regard the inhabitants of the place, and theſe are alſo ten in number. 1. Their ſtature, ſhape, colour, and the length of their lives; their origin, meat, and drink. 2. Their arts, and the profits which ariſe from them, with the merchandize and wares they barter one with another. 3. Their virtues and vices, learning, capacities, and ſchools. 4. Their ceremonies at births, marriages, and funerals. 5. The language which the inhabitants uſe. 6. Their political government. 7. Their religion and church government. 8. Their cities and famous places. 9. Their remarkable hiſtories. 10. Their famous men, artificers, and inventions of the natives.

Theſe are the three kinds of occurrences to be explained in ſpecial geography.

In univerſal geography, the abſolute diviſion of the earth, and the conſtitution of its parts, are examined; and the celeſtial phænomena in general are to be applied to their reſpective countries in ſpecial geography.

The principles of geography, or thoſe from which arguments are drawn for proving of propoſitions in that ſcience, are, according to Varenius, of three ſorts. 1. Geometrical, arithmetical, and trigonometrical propoſitions. 2. Aſtronomical precepts and theorems. 3. Experience, being that upon which the greateſt part of geography, and chiefly the ſpecial, is founded.

In proving geographical propoſitions, we are to obſerve that ſeveral properties, and chiefly the celeſtial, are confirmed by proper demonſtrations; but in ſpecial geography, excepting the celeſtial, almoſt every thing is explained without demonſtration; being either grounded on experience and obſervation, or on the teſtimony of our ſenſes: nor can they be proved by any other means. There are alſo ſeveral propoſitions proved, or rather expoſed to view, by the terreſtrial globe, or by geographical maps. See the articles GLOBE and MAP.

Other propoſitions cannot be ſo well proved, yet are received as apparent truths. Thus, tho' we ſuppoſe all places on the globe, and in maps, to be laid down in the ſame order as they are really on the earth; nevertheleſs, in theſe matters, we rather follow the deſcriptions that are given by geographical writers.

The manner in which we have treated the ſeveral geographical articles that occur throughout this work, may be ſeen under each head, and our diviſion of the ſcience may be ſeen in the introduction.

Geography is very antient, at leaſt the ſpecial part thereof; for the antients ſcarce went beyond the deſcription of countries. It was a conſtant cuſtom among the Romans, after they had conquered and ſubdued any province, to have a map or printed repreſentation thereof, carried in triumph, and expoſed to the view of the ſpectators. Hiſtorians relate, that the roman ſenate, about an hundred years before Chriſt ſent geographers into divers parts to make an accurate ſurvey and menſuration of the whole globe, but they ſcarce ever ſaw the twentieth part of it.

Before them, Neco, king of Egypt, ordered the Phœnicians to make a ſurvey of the whole coaſt of Africa, which they accompliſhed in three years. Darius procured the Ethiopic ſea, and the mouth of the Indus, to be ſurveyed; and Pliny relates, that Alexander, in his expedition into Aſia, took two geographers to meaſure and deſcribe the roads; and that from their itineraries, the writers of the following ages took many particulars. Indeed this may be obſerved, that whereas moſt other arts and ſciences are ſufferers by war, geography and fortification alone have been improved thereby. Geography, however, muſt have been exceedingly defective, as a great part of the globe was then unknown, particularly all America, the northern parts of Europe and Aſia, with the Terra Auſtralis, and Magellanica; and as they were ignorant of the earth's being capable to be ſailed round, and of the torrid zone's being habitable, &c.

The honour of reducing geography to art and ſyſtem, was reſerved for Ptolemy, who, by adding mathematical advantages to the hiſtorical method in which it had been treated of before, has deſcribed the world in a much more intelligible manner: he has delineated it under more certain rules, and by fixing the bounds of places from longitude and latitude, hath diſcovered others miſtakes, and has left us a method of diſcovering his own.

There is one thing yet very lame in our geography, the fixing the true longitude of places; and though ſeveral new ways have been lately tried to redreſs this inconvenience, both from exact pendulums, and from other obſervations, upon the immerſions and emerſions of Jupiter's ſatellites, yet they have not altogether proved effectual. See the article LONGITUDE.

The principal writers upon geography, among the antients, are Ptolemy, Pliny, and Strabo: among the moderns, Joannes de Sacroboſco, Cluverius, Heylen, Ricciolus, Weigelius, de Chales, and, above all, Varenius, with Jurin's additions; to which may be added Leibnecht, Sturmius, Morden, Gordon, Salmon, &c.

GEOMANCY, γεωμαντεια, according to Polydore Virgil, a ſpecies of divination performed by means of chinks made in the ground. Though others think it conſiſted in making a number of little dots on paper, at random; and from the various figures which thoſe make, forming a judgment of futurity.

GEOMETRICAL, in general, an appellation given to whatever belongs to, or is ſtrictly connected with geometry. See the article GEOMETRY.

GEOMETRICAL *conſtruction of equations*. See the article CONSTRUCTION.

GEOMETRICAL CURVE. See CURVE.

GEOMETRICAL LOCUS, or PLACE. See the article LOCUS.

GEOMETRICAL PACE. See PACE.

GEOMETRICAL PLANE, in perſpective. See the article PLANE.

GEOMETRICAL PROGRESSION and PROPORTION. See PROGRESSION and PROPORTION.

GEOMETRICAL *ſolution of a problem*, is when it is ſolved according to the rules of geometry, and by ſuch lines as are truly geometrical, and agreeable to the nature of the problem. See PROBLEM.

GEOMETRY, γεωμετρια, originally ſignified no more than the art of meaſuring the earth, or any diſtances or dimenſions within it; but at preſent, it denotes the ſcience of magnitude in general; comprehending the doctrine and relations of whatever is ſuſceptible of augmentation or diminution, conſidered in that light.

Hence, to geometry may be referred the conſideration not only of lines, ſurfaces, and ſolids; but alſo of time, velocity, number, weight, &c.

Plato thought the word geometry an improper name for this ſcience, and accordingly ſubſtituted in its place the more extenſive one of menſuration; and, after him, others gave it the title of pantometry, as demonſtrating not only the quantities of all manner of magnitudes, but alſo their qualities, ratios, poſitions, transformations, relations, *&c.* And Proclus calls it the knowledge of magnitude and figures, and their limitations; alſo of their motions, and affections of every kind.

Origin and progreſs of GEOMETRY. This ſcience had its riſe among the Egyptians, who were in a manner compelled to invent it to remedy the confuſion which generally happened in their lands, from the inundations of the river Nile, which carried away all boundaries, and effaced all the limits of their poſſeſſions. Thus this invention, which at firſt conſiſted only in meaſuring the lands, that every perſon might have what belonged to him, was called geometry, or the art of meaſuring land; and it is probable, that the draughts and ſchemes, which they were annually compelled to make, helped them to diſcover many excellent properties of theſe figures; which ſpeculations continued to be gradually improved, and are ſo to this day.

From Egypt geometry paſſed into Greece, where it continued to receive new improvements in the hands of Thales, Pythagoras, Archimedes, Euclid, *&c.* The elements of geometry, written by this laſt in fifteen books, are a moſt convincing proof to what perfection this ſcience was carried among the antients. However, it muſt be acknowledged, that it fell ſhort of modern geometry, the bounds of which, what by the invention of fluxions, and the diſcovery of the almoſt infinite orders of curves, are greatly enlarged. See the articles CURVE and FLUXION.

We may diſtinguiſh the progreſs of geometry into three ages: the firſt of which was in its meridian glory at the time when Euclid's Elements appeared; the ſecond, beginning with Archimedes, reaches to the time of Des Cartes, who, by applying algebra to the elements of geometry, gave a new turn to this ſcience, which has been carried to its utmoſt perfection by Sir Iſaac Newton and Mr. Leibnitz.

Diviſion of GEOMETRY. This ſcience is uſually diſtinguiſhed into elementary, and higher or ſublime geometry.

The firſt, or elementary geometry, treats of the properties of right lines, and of the circle, together with the figures and ſolids formed by them. The doctrine of lines come firſt, then that of ſurfaces, and laſtly that of ſolids.

The higher geometry comprehends the doctrine of the conic ſections, and numerous orders of curves. See the article CONIC SECTIONS and CURVE.

Geometry is again divided into ſpeculative and practical; the former treating of the properties of lines and figures, as Euclid's Elements, Appolonius's Conic Sections, *&c.* and the latter ſhewing how to apply theſe ſpeculations to the uſe of menſuration, navigation, ſurveying, taking heights and diſtances, gauging, gunnery, *&c.* See the article MENSURATION, NAVIGATION, *&c.*

We have an excellent treatiſe on this ſubject by Dr. Gregory, with additions by Mr. Maclaurin: it is divided into three parts; the firſt of which teaches the menſuration of lines and angles. In the ſecond, ſurfaces are treated of; and theſe not only ſuch as are plain, but likewiſe curve-ſurfaces, as thoſe of a cylinder, cone, and ſphere. The third part treats of ſolid figures and their menſuration, as ſphere, cylinder, cone, *&c.* See the articles, SPHERE, CYLINDER, *&c.*

Uſefulneſs of GEOMETRY. The uſefulneſs of this ſcience extends to almoſt every art and ſcience. It is by the help of it that aſtronomers turn their obſervations to advantage, regulate the duration of times, ſeaſons, years, cycles, and epochas; and meaſure the diſtance, motions, and magnitudes of the heavenly bodies. It is by it that geographers determine the figure and magnitude of the whole earth; and delineate the extent and bearings of kingdoms, provinces, harbours, *&c.* It is from this ſcience too, that architects derive their juſt meaſures, in the conſtruction of public edifices as well as of private houſes. See the articles ASTRONOMY, GEOGRAPHY, and ARCHITECTURE.

It is by the aſſiſtance of geometry that engineers conduct all their works, take the ſituation and plans of towns, the diſtances of places, and the meaſure of ſuch things as are only acceſſible to the ſight. It is not only an introduction to fortification, but highly neceſſary to moſt mechanics, eſpecially carpenters, joiners, mathematical-inſtrument-makers, and all who profeſs deſigning. See the articles CARPENTRY, JOINERY, SHIP, ENGRAVING, DESIGNING, *&c.*

On geometry likewiſe depends, the theory of muſic, optics, perſpective, drawing, mechanics, hydraulics, pneumatics, *&c.* See MUSIC, OPTICS, PERSPECTIVE, DRAWING, MECHANICS, *&c.*

GEOPONIC, ſomething relating to agriculture. See AGRICULTURE.

GEORGE, or *Knights of St.* GEORGE, has been the denomination of ſeveral military orders, whereof that of the garter is one of the moſt illuſtrious. See GARTER.

There is alſo one of theſe orders ſtill ſubſiſting at Genoa.

Religious of the order of St. GEORGE, form ſeveral congregations in Italy and other places.

St. GEORGE *del Mina*, the capital of the dutch ſettlements, on the Gold-coaſts of Guinea, ſituated ſeven or eight miles weſt of Cape-coaſt-caſtle, the capital of the britiſh ſettlements there: weſt longitude 5′, and north latitude 5°.

Fort St. GEORGE, a town and fort on the coaſt of Coromandel, in the hither India: eaſt lon. 80°, and north lat. 13°.

The town is divided into the White and Black-town. The fort, and White-town, which adjoins to it, are inhabited only by Britiſh; the whole circumference, which is not above half a mile, being ſurrounded by a ſtone wall. The outward or Black-town, called Madraſs, has been lately encompaſſed by a ſtone wall and baſtions, and is about a mile and a half in circumference; the whole being almoſt environed by a river and the ſea.

St. GEORGE'S, the largeſt of the Bermuda or Summer-iſlands.

Croſs of St. GEORGE, a red one in a field argent, which makes part of the britiſh ſtandard. See CROSS and GARTER.

GEORGIA, in Aſia, a province bounded by Circaſſia and Degeſtan on the north by the Caſpian ſea on the eaſt, by Armenia or Turcomania on the ſouth, and by Mingrelia on the weſt.

GEORGIA, in America, one of the britiſh plantations, taken out of South-Carolina, from which it is ſeparated by the river Savannah on the north, and bounded by the Atlantic ocean on the eaſt, by the river of St. John, which divides it from ſpaniſh Florida, on the ſouth and weſt.

GEORGIAN MONKS and NUNS, religious of Georgia, in Aſia, who follow the rule of St. Baſil. See the article BASIL.

GEORGIC, a poetical compoſition upon the ſubject of huſbandry, containing rules therein, put into a pleaſing dreſs, and ſet off with all the beauties and embelliſhments of poetry.

The ſtyle proper to a georgic muſt be worked up with a great deal of thought and vigour, that the words may be lively, and every thing the poet deſcribes may immediately riſe up to the reader's view. Heſiod and Virgil are the two greateſt maſters of this kind of poetry. In Virgil's Georgics are contained the moſt uſeful rules for huſbandry in all its branches. Virgil has infinitely exceeded Heſiod in this ſort of writing: he began his Georgics at the perſuaſion of Mæcenas, and was near ſeven years about them: they are, with reſpect to the diction, the moſt finiſhed of all his works, and even of all the poems that ever were compoſed in latin. The moderns have produced nothing in this kind, except Rapin's book Of Gardening, and the celebrated poem entitled Cyder, by Mr. Philips, who, if he had enjoyed the advantage of Virgil's language, would have been ſecond to Virgil in a much nearer degree.

GERANITES, in natural hiſtory, an appellation given to ſuch of the ſemipellucid gems, as are marked with a ſpot reſembling a crane's eye.

GERANIUM, CRANE'S BILL, in botany, a genus of the monadelphia-decandria claſs of plants, the flower of which conſiſts of five large, patent, oval, and vertically cordated petals; the fruit is a capſule, of the form of a crane's bill.

Geranium ſtands recommended by authors, as one of the greateſt vulneraries and aſtringents of the vegetable world, particularly for ſtopping hæmorrhages, exceſs of the menſes, *&c.*

GERARDIA, in botany, a genus of the didynamia-angioſpermia claſs of plants, the corolla of which conſiſts of a ſingle ringent petal; the tube is roundiſh, and longer than the cup; the upper lip is erect, obtuſe, plain, and emarginated; the lower lip is reflected, and divided into three ſegments: the fruit is an oval capſule, containing two cells, and conſiſting of two valves; the ſeeds are oval and ſingle.

This plant is much recommended in gouty diſorders.

GERBERA, in botany, a genus of the ſyngeneſia-polygamia claſs of plants, the general corolla of which is radiated, with very numerous hermaphrodite corollulæ on the diſc, which are monopetalous, erect, and divided into three ſegments at the limb; the ſtamina are five very ſhort filaments; the ſeeds are ſingle, oblong, crowned with ſlender down, and contained in the cup.

GERFALCON, or GYRFALCON, among ſportſmen, a hawk of great force. See the article HAWK.

The gerfalcon is the largeſt of the falcon-kind, with head and eyes like thoſe of the haggard. She is ſtrong armed, having long ſtretchers and ſingles; and being of a fierce and hardy nature, is extremely difficult to be reclaimed; but when once ſhe is overcome, ſhe proves an excellent hawk, and will ſcarce refuſe to fly at any thing. See FALCONRY.

GERGENTUM, a town of Sicily, the Agrigentum of the antients, about fifty-five miles ſouth-eaſt of Palermo: eaſt long. 13° 30′, and north lat. 37° 20′.

GERMAINS, or *St.* GERMAINS, a town and royal palace of France, fourteen miles north-weſt of Paris.

St. GERMAINS is alſo a borough of Cornwal, eight miles weſt of Plymouth. It ſends two members to parliament.

GERM, among gardeners, the ſame with bud. See the article BUD.

GERMAN, in genealogy, denotes entire or whole: thus, a brother-german is one both by the father's and mother's ſide; and couſins-german are the children of brothers or ſiſters.

GERMAN, or GERMANNIC, alſo denotes any thing belonging to Germany; as the german empire, german flute, *&c.*

GERMANDER, in botany, the engliſh name of the teucrium of Linnæus. See the article TEUCRIUM.

Water GERMANDER, a plant called by botaniſts ſcordium. See SCORDIUM.

Wild-GERMANDER, a ſpecies of a genus of plants, called by botaniſts veronica. See the article VERONICA.

GERMANY, an extenſive empire of Europe, ſituated between 5° and 19° eaſt longitude, and between 45° and 55° north latitude; bounded by Denmark and the Baltic ſea on the north, by Poland and Hungary on the eaſt, by Switzerland and the Alps on the ſouth, and by France, Holland, *&c.* on the weſt.

It is divided into ten circles, three of which lie on the north, *viz.* Upper and Lower Saxony, and Weſtphalia; three on the ſouth, *viz.* Auſtria, Bavaria, and Swabia; three about the middle, *viz.* Franconia, and the Upper and Lower Rhine; the tenth, which conſiſted of the dutchy of Burgundy and the ſeventeen provinces of the Netherlands, have long been detached from the empire. See SAXONY, WESTPHALIA, *&c.*

There are in Germany upwards of three hundred ſovereign princes and ſtates, moſt of them arbitrary in their reſpective territories.

GERMEN, or GERM, the ſame with bud. See the article BUD.

GERMERSHEIM, a town of Germany, ſubject to France, about ten miles eaſt of Landau: eaſt long. 8° 15′, and north lat. 49° 12′.

GERMINATION, the firſt ſprouting of the ſeeds of plants. See VEGETATION.

GERONTES, in grecian antiquity, a ſort of magiſtrates of antient Sparta, anſwering to the areopagites at Athens.

GERTRUDENBURG, a fortified town of the united Netherlands, in the province of Holland, nine miles north of Breda; ſubject to the prince of Orange.

GERUND, in grammar, a verbal noun of the neuter gender, partaking of the nature of a participle, declinable only in the ſingular number, through all the caſes except the vocative; as, nom. *amandum*, gen. *amandi*, dat. *amando*, accuſ. *amandum*, abl. *amando*.

Grammarians are very much embarraſſed to ſettle the proper nature and character of gerunds. It is certain they are no verbs, nor diſtinct moods of verbs, in regard they do not mark any judgment or affirmation of the mind, which is the eſſence of a verb; beſides their having caſes, which verbs have not. Some, therefore, will have them to be adjectives paſſive, whoſe ſubſtantive is the infinitive of the verb, and retaining the ordinary regimen thereof. See the article NOUN.

The gerunds are derived from active, neuter, and deponent verbs; and, for the moſt part, they follow their ſignification; as, *docendum*, from *doceo*; *currendo*, from *curro*; *loquendum*, from *loquor*.

GESNERIA, in botany, a genus of plants, of the didynamia claſs, the flower of which is monopetalous, tubular, and divided into five ſegments at the limb; the fruit is a roundiſh capſule, containing a very great number of extremely ſmall ſeeds.

GESSERIT, or *Quam diu ſe bene* GESSERIT. See the article QUAM DIU.

GESSES, or JESSES, the furniture belonging to a hawk. See JESSES.

GESTATION, among phyſicians, the ſame with pregnancy. See PREGNANCY.

GESTICULATION, in rhetoric, ſignifies the affected action of an orator, which is deemed a great fault. See ACTION.

GESTRICIA, a province of Sweden, bounded by Helſingia on the north, by the Bothnic gulph on the eaſt, by Upland on the ſouth, and by Dalecarlia on the weſt.

GESTU ET FAMA, an antient writ, where a perſon's good behaviour was impeached, now out of uſe.

GESTURE, in rhetoric, conſiſts chiefly in the proper action of the hands and face. It is a kind of natural language, that ſupplies the uſe of ſpeech in perſons born dumb. See the article ACTION.

GETHYLLIS, in botany, a genus of the decandria monogynia claſs of plants, the corolla of which conſiſts of a ſingle petal; the tube is filiform and very long; the limb is plane, divided into ſix equal ſegments, of a lanceolated figure, and but about a third part the length of the tube, the fruit is an oblong, ventricoſe, triangular capſule, with three cells; the ſeeds are numerous.

GEVAUDAN, a territory of Languedoc, adjoining to the Cevennes.

GEUM, *avens*, in botany, a genus of the icoſandria-pentagynia claſs of plants, the corolla of which conſiſts of five roundiſh petals, with narrow ungues of the length of the cup, and inſerted into it; there is no pericarpium; the common receptacle of the ſeeds is oblong, hairy, and placed on the cup, which is, at that time, reflex: the ſeeds are numerous, compreſſed, hiſpid, and each furniſhed with a long geniculated ſtyle.

GHENT, or **GAUNT**, a city and capital of Flanders, thirty miles north weſt of Bruſſels: eaſt longitude 3° 36′, north latitude 51°.

It is a large fortified town, twelve miles in circumference, and defended by a citadel; and yet is a place of no great ſtrength, by reaſon of the vaſt extent of ground it takes in.

GIAGH, in chronology, a cycle of twelve years; in uſe among the Turks and Cathayans. See the article CYCLE.

Each year of the giagh bears the name of ſome animal: the firſt, that of a mouſe; the ſecond, that of a bullock; the third, of a lynx or leopard; the fourth, of a horſe; the fifth, of a crocodile; the ſixth, of a ſerpent; the ſeventh, of a horſe; the eighth, of a ſheep; the ninth, of a monkey; the tenth, of a hen; the eleventh, of a dog; and the twelfth, of a hog.

They alſo divide the day into twelve parts, which they call giaghs, and diſtinguiſh them by the name of ſome animals. Each giagh contains two of our hours, and is divided into eight kehs, as many as there are quarters in our hours.

GIALLOLINO, in natural hiſtory, a heavy, friable, fine, yellow ochre, called naples-yellow, and much uſed among painters, who eſteem it a very fine colour. See the article OCHRE.

GIANT, γιγας, a perſon of enormous bulk, or ſtature.

The reality of giants, and of nations of giants, is much controverted among the learned. Dr. Derham obſerves, that though we read of giants before Noah's flood, yet there is great reaſon to think the ſize of a man was always the ſame from the creation: for as to the nephilim, or giants, in Gen. vi. the antients vary about them; ſome take them for great atheiſts, and monſters of impiety, rapine, tyranny, and all wickedneſs, as well as of monſtrous ſtature. And as to thoſe Numb. xiii. repreſented as men of gigantic ſize, it is probable the fears of the ſpies might have added thereto: however this be, it is plain that in both theſe places giants are ſpoke of as rarities and wonders of the age, not of the common ſtature; and ſuch inſtances we have had in all ages.

GIANT's BONES, in natural hiſtory, a name erroneouſly given to certain foſſile bones, vulgarly ſuppoſed to have been the bones of giants; but, in reality, are thoſe of the elephant or whale-kind.

GIANT's CAUSEWAY, a vaſt collection of a black kind of marle, called baſaltes, in the county of Antrim, in Ireland. See the article BASALTES.

GIAROLA, in ornithology, a ſpecies of lark, with a remarkable long heel.

GIAROLO, a ſpecies of ſnipe, with a white tail. See the article SNIPE.

GIBBOUS, a term in medicine, denoting any protuberance or convexity of the body, as a perſon hunched, or humpbacked.

Gibboſity is a preternatural incurvation of the ſpina dorſi either backward, or on one ſide. Infants are more ſubject to this diſorder than adults, and it oftner proceeds from external, than from internal cauſes. A fall, blow, or the like violence frequently thus diſtorts the tender bones of infants. When it proceeds from an internal cauſe, it is generally from a relaxation of the ligaments that ſuſtain the ſpine, or a caries of its vertebræ; though the ſpine may be reflected forward, and the back thrown out, by a too ſtrong and repeated action of the abdominal muſcles; and this, if not timely redreſſed, uſually grows up and fixes as the bones harden, till in adults it is totally irretrievable; but when the diſorder is recent, and the perſon young, there are there are ſome hopes of a cure. The common method is by a machine of paſtboard, wood, or ſteel, which is made to preſs principally upon the gibbous part, and this by long wearing may ſet all right. The ſurgeons however have a different inſtrument, which they call a croſs, much more efficacious, though not quite ſo convenient in the wearing; by the uſe of this, the parts are always prevented from growing any worſe, and are often cured. During the application of theſe aſſiſtances, Heiſter orders the parts to be at times rubbed with hungary water, ſpirit of lavender, and the like, and defended with a ſtrengthening plaſter of oxycroceum, opodeldoc, or the like.

GIBBOUS, in aſtronomy, a term uſed in reference to the enlightened parts of the moon, whilſt ſhe is moving from the firſt quarter to the full, and from the full to the laſt quarter: for all that time the dark part appears horned, or falcated; and the light one hunched out, convex, or gibbous. See the article MOON.

GIBELINS, or GIBELLINS, a famous faction in Italy, oppoſite to another, called the guelphs.

Theſe two factions ravaged and laid waſte Italy for a long ſeries of years, ſo that the hiſtory of that country, for the ſpace of two centuries, is no more than a detail of their mutual violences and ſlaughters. The gibelins ſtood for the emperor againſt the pope: but concerning their origin and the reaſon of their names, we have but a very obſcure account. According to the generality of authors, they roſe about the year 1240, upon the emperor Frederic II's being excommunicated by pope Gregory IX. Other writers maintain, that the two factions aroſe ten years before, though ſtill under the ſame pope and emperor. But the moſt probable opinion is that of Maimburg, who ſays, that the two factions of guelphs and gibelins aroſe from a quarrel between two antient and illuſtrious houſes on the confines of Germany, that of the Henrys of Gibeling, and that of the guelphs of Adorf.

GIBET, a kind of gallows, whereon criminals are executed, or hung in chains. See the article GALLOWS.

GIBLETS, *gigeriæ*, the offals of poultry, particularly of a gooſe and duck, including the head and neck, heart, liver, pinions, and legs; which the art of cookery has buſied itſelf about, by inventing ragouts, pies, ſoops, &c. made of them.

GIBRALTAR, a port-town of Andaluſia, in Spain, ſubject to Great Britain: weſt long. 6°, and north lat. 36°.

It ſtands at the foot of mount Calpe, one of Hercules's Pillars, about ſixteen miles north of Ceuta, in Africa, from which it is divided by the Streights, to which it gives name. It is built on a rock, in a peninſula, and can only be approached on the land-ſide by a very narrow paſſage between the mountain and the ſea: croſs this paſſage the Spaniards have drawn a line, and fortified it, to prevent the garriſon's having any communication with the country.

The Streights of Gibraltar are about twenty-four miles long, and fifteen broad.

GIESEN, a town of Germany, thirty miles north of Francfort.

GIFT, in law, a conveyance, by which either lands or goods are paſſed: it is of larger extent than a grant, being applied to things moveable and immoveable.

A gift may be by deed, by word, or in law: thus, all a perſon's goods and chattels, except in ſome ſpecial caſes, may be given without deed; though ſuch a gift is liable to ſuſpicion. When ſuch a gift is made in ſatisfaction of a debt, it ſhould be done before witneſſes of credit; that the goods and chattels be, at the ſame time, appraiſed to the full value; and that the gift be expreſly made in full ſatisfaction of the debt.

As to gifts in law, where a man is married, all the goods and chattels of his wife belong to the huſband; alſo, if a perſon be made executor of a will, by gift in law, all the teſtator's goods are his, after paying the teſtator's debts.

And as to deed of gift, all things that lie in livery, as meſſuages, lands, woods, &c. may be given or granted in fee for life, or years, at firſt; and be aſſigned over forever, afterwards. Such a deed may be made upon condition; and, if it be of goods and chattels, the delivery of a ſixpence is a good ſeiſin of the whole.

GIGANTIC, ſomething of a monſtrous ſize, like that of giants. See GIANT.

GIGG, or JIGG, in muſic, denotes a briſk and lively air; or an airy kind of dance, to a ſprightly meaſure.

GIGOT-BRANCH, in the manege. See the article BRANCH.

GILAN, a province of Perſia, bounded by the Caſpian ſea on the north. Its capital is a city of the ſame name: eaſt longit. 48°, and north lat. 37°.

GILBERTINES, a religious order founded in England by St. Gilbert, in the reign of Henry I. The nuns follow the rule of St. Benedict, and the monks that of St. Auguſtin. There were many monaſteries of this order in different parts of England.

GILD, or **GUILD**. See GUILD.

GILDING, the art of ſpreading or covering a thing with gold, either in leaf or liquid. See the article GOLD.

We have this advantage over the antients, in the manner of uſing and applying the gold, that the ſecret of painting in oil, lately diſcovered, furniſhes us with means of gilding works, capable of enduring all the violences of time and weather, which theirs could not.

There are ſeveral methods of gilding in uſe among us, as gilding in water, gilding in oil, gilding by fire, *&c.* of each of which in order.

The method of water-GILDING. Water-gilding requires more preparation than oil-gilding, and is chiefly on wooden works, and thoſe made of ſtucco; and theſe two muſt be ſheltered from the weather. A ſize is uſed for this way of gilding made of ſhreads, *&c.* of parchment or gloves boiled in water to the conſiſtence of a jelly. If the thing to be gilt be of wood, it is firſt waſhed with this ſize, boiling hot, and then ſet to dry; and afterwards with white paint mixed up with the ſame ſize. Some uſe ſpaniſh white for this purpoſe, and others plaſter of Paris, well beaten and ſifted. This ſized paint muſt be laid on with a ſtiff bruſh; which is to be repeated ſeldomer or oftener according to the nature of the work, as ten or twelve times in flat or ſmooth works, but ſeven or eight will be ſufficient in pieces of ſculpture. In the former caſe they are applied by drawing the bruſh over the work, in the latter by dabbing it. When the whole is dry, they moiſten it with fair water, and rub it over with ſeveral pieces of coarſe linen, if it be on the flat; if not, they beat or ſwitch it with ſeveral ſlips of the ſame linen, tied to a little ſtick, to make it follow and enter all the cavities and depreſſures thereof.

Having thus finiſhed the white, the next thing to be done, is to colour it with yellow ochre: but if it be a piece of ſculpture in relievo, they firſt touch it up, and prepare the ſeveral parts, which may have happened to have been disfigured, by the ſmall iron inſtruments, as gouges, chiſſels, *&c.* The ochre uſed for this purpoſe muſt be well ground and ſifted, and mixed up with the ſize before-mentioned. This colour is to be laid on hot; and in works of ſculpture, ſupplies the place of gold, which ſometimes cannot be carried into all the depreſſures and cavities of the foliages and other ornaments.

A lay is alſo applied over this yellow, which ſerves for the ground on which the gold is to be laid: this lay is uſually compoſed of armenian bole, blood-ſtone, black lead, and a little fat; to which ſome add ſoap, and oil of olives; others, burnt-bread, biſtre, antimony, glaſs of tin, butter, and ſugar-candy. Theſe ingredients being all ground down together with hot ſize, three lays of this compoſition is applied upon the yellow, the one after the other has been dried; being cautious not to put any into the cavity of the work to hide the yellow.

The bruſh, uſed for this purpoſe, muſt be a ſoft one; and when the matter is become very dry, they go over it again with a ſtronger bruſh, to rub it down, and take off the ſmall grains that ſtick out, in order to facilitate the burniſhing of the gold.

To be prepared for gilding, you muſt have three ſorts of pencils; one to wet, another to touch up and amend, and a third to flatten; alſo a gilding cuſhion, for ſpreading the leaves of gold on when taken out of the book; a knife to cut them, and a ſquirrel's tail fitted with a handle; or elſe a piece of fine ſoft ſtuff on a ſtick, to take them up directly and apply them.

You are firſt to begin with wetting your pencils; by which the laſt lay laid on with water is moiſtened, that it may the better receive and retain the gold. Then you are to lay the leaves of gold on the cuſhion, and if whole, you muſt take up with the ſquirrel's tail, but if in pieces, with the other inſtrument, or the knife wherewith they are cut, and lay and ſpread them gently on the parts of the work you had moiſtened before. If the leaves, as they frequently do, happen to crack or break in laying on, theſe breaches muſt be made up with ſmall bits of leaf, taken up upon the repairing pencil, and the whole work is to be ſmoothed either with the ſame pencil, or another ſomething larger; the gold being preſſed into the dents, into which it could not be ſo eaſily carried by the ſquirrel's tail.

The work having been thus far gilded, muſt be ſet to dry, in order to be burniſhed or flatted. See BURNISHING and FLATTING.

The laſt operation is the applying the vermeil in all the little lines and cavities; and to ſtop and amend any little faults with ſhell-gold. The compoſition called vermeil is made of gum guttæ, vermilion, and a little of ſome ruddy-brown, ground together with venetian varniſh and oil of turpentine. Some gilders, inſtead of this, make ſhift with fine lacca, or dragon's blood, with gum-water.

Sometimes inſtead of burniſhing the gold, they burniſh the ground or compoſition laid on the laſt before it, and only afterwards waſh the part over with the ſize. This method is chiefly practiſed for the hands, face, and other nudities in relievo: which, by this means, do not appear ſo very brilliant as the parts burniſhed, though much more ſo than the parts perfectly flat.

To gild a piece of work, and yet preſerve white grounds, they apply a lay of ſpaniſh white, mixed with a weak fiſh-glue on all the parts of the ground whereon the yellow or the laſt lay might run.

The method of GILDING *in oil.* This operation requires much leſs apparatus than that before-mentioned. The baſis or matter whereon the gold is laid, in this method, is the remains of colours found ſettled to the bottom of the pots in which painters waſh their pencils. This matter, which is very viſcid or ſticky, is firſt ground, and then paſſed through a linen-cloth, and thus laid on the matter to be gilt, after it is waſhed once or twice over with ſize; and if it be wood, with ſome white paint.

When this is almoſt dry, but yet is ſtill unctuous enough to catch and retain the gold, the leaf-gold is laid on, either whole, if the work be large, or cut to pieces, if ſmaller: the leaves of gold are taken up and laid on with a piece of fine, ſoft, well-carded cotton; or ſometimes by a palate for the purpoſe, or ſometimes with the knife with which the leaves were cut, according to the parts of the work that are to be gilded, or the breadth of the gold that is to be laid on. As the gold is laid on, they paſs over it a coarſe ſtiff pencil or bruſh, to make it ſtick and as it were incorporate with the ground; and after this they mend any cracks that may have happened in it, either with the ſame pencil or one that is ſmaller, as has been ſhewn before in water-gilding.

This kind of gilding is chiefly uſed for domes and roofs of churches, courts, banquetting-houſes, &c. and for figures of plaſter of Paris, lead, &c.

The method of GILDING *with liquid gold.* This is performed by gold amalgamated with mercury, in the proportion of about an ounce of mercury to a dram of gold. To perform this, they heat a crucible red-hot, and then put the gold and mercury into it, ſtirring them gently about till the gold be found melted, and incorporated into a maſs with the mercury. When this is done, they caſt them into water, to waſh and purify them; and out of that into other waters, where the amalgama, which is almoſt as liquid as if there were nothing but quick-ſilver in it, may be preſerved a long time for uſe.

Before they proceed to lay this amalgamated gold on the metal, they firſt render the metal rough, by waſhing it over with aqua fortis, or aqua ſecunda; and afterwards rinſe the metal in fair water, and ſcour it a little with fine ſand, and then it is ready for the gold.

They next cover over the metal with the mixture of gold and mercury, taking it up with a ſlip of copper, or a bruſh made of braſs-wire, ſpreading it as even as poſſible, to do which they wet the bruſh from time to time in fair water. Then they ſet the metal to the fire, upon a grate, or in a ſort of cage, under which ſtands a pan of coals; and in proportion as the mercury, evaporating and flying off, diſcovers the places where gold is wanting, they take care to ſupply them, by adding new parcels of amalgama.

Then the work is rubbed over with the wire-bruſh, dipt in beer or vinegar, which leaves it in a condition to be brought to a colour which is the laſt part of the proceſs, and which the gilders keep to themſelves as a mighty ſecret.

The method of GILDING *by fire on metal.* To prepare the metal, they ſcratch it well, or rake it; then poliſh it with a poliſher; and afterwards ſet it to the fire to blue, *i. e.* to heat, till it appear of a blue colour. When this has been done, they clap on the firſt lay of leaf gold, rubbing it lightly down with a poliſher; and expoſe it thus to a gentle fire. They uſually give it but three ſuch lays, or four at the moſt, each lay conſiſting of a ſingle leaf for common works, and of two for extraordinary ones: after each lay, it is ſet a-freſh to the fire; and after the laſt lay, the gold is in condition to be burniſhed.

To gild paper. Grind bole-armoniac with rain-water, and give one laying of it; when it is dry, take glair of eggs, and add to it a little ſugar-candy and gum-water, which lay over the former, and upon this, when it is dry enough, lay leaf-ſilver, or leaf-gold.

To gild the leaves of books. Take bole-armoniac, eight penny-weight; ſugar-candy, two penny-weight: mix and grind them with glair of eggs: then on a bound book (while it is in the preſs, after it hath been ſmeared with glair of eggs, and is dried) ſmear the ſaid compoſition, let it dry, then rub it well and poliſh it; then with fair water wet the edges of the book, and ſuddenly lay on the gold, preſs it down gently with cotton, let it dry, and then poliſh it with a tooth.

GILDING *of china* or *porcelain ware.* See the article PORCELAIN.

GILL, a meaſure of capacity, containing a quarter of a pint. See PINT and MEASURE.

GILL is alſo a name for ground-ivy, which, being infuſed in ale, makes what is known by the name of gill-ale; a ſort of medicated ale, ſaid to be abſterſive and vulnerary.

GILLA VITRIOLI, a name ſometimes given to the emetic ſalt of vitriol. See the article VITRIOL.

GILLS, *branchiæ*, in ichthyology. See the article BRANCHIÆ.

GILOLO, a large iſland of the Pacific ocean, lying between 1° ſouth latitude and 2° north latitude, and between 125° and 128° eaſt longitude.

GILOLO is alſo the name of the capital of the above iſland, ſituated in 40′ north latitude.

GILT-HEAD, *aurata*, in ichthyology, the ſharp-backed ſparus, with a crooked gold-coloured line between the eyes. It is a very beautiful fiſh, the ground-colour of whoſe body is an olive-brown, but elegantly variegated with a number of different colours. See SPARUS.

GILT-VARNISH. See VARNISH.

GIN, or GENEVA, among diſtillers. See the article GENEVA.

GIN, in mechanics, a machine for driving piles, fitted with a windlaſs and winches at each end, where eight or nine men heave, and round which a rope is reeved, that goes over the wheel at the top: one end of this rope is ſeized to an iron-monkey, that hooks to a beetle of different weights, according to the piles they are to drive, being from eight to thirteen hundred weight; and when hove up to a croſs-piece, near the wheel, it unhooks the monkey, and lets the beetle fall on the upper end of the pile, and forces the ſame into ground: then the monkey's own weight over-hauls the windlaſs, in order for its being hooked again to the beetle. See the article ENGINE.

GINGEN, an imperial city of Germany, twenty miles eaſt of Ulm: eaſt lon. 10°, and north lat. 48° 36′.

GINGER, *zinziber*, in botany. See the article ZINZIBER.

The root of this plant is too well known to need any deſcription: it will be ſufficient to obſerve, that it is of the tuberous kind, knotty, crooked, and irregular, and divaricated into many branches, of a pale yellowiſh colour when broken, and, like the contrayerva, of a fibrous ſtructure. This root is of a very hot, acrid, and pungent taſte, though aromatic withal, and of a very agreeable ſmell.

Ginger is too cheap to be ſophiſticated, and too well known to need any directions about the choice of it; it may only be obſerved that the hardeſt and firmeſt pieces are the beſt. The Indians are very fond of ginger; they eat both the young ſhoots of the leaves, and the roots themſelves, cut ſmall, in their ſallads and broths; and they make an excellent ſweetmeat of them, preſerving them with ſugar. Ginger is an excellent carminative and ſtomachic; it aſſiſts digeſtion, expels flatuſes, and takes off colic-pains, often almoſt inſtantaneouſly. It is alſo highly eſteemed by ſome as a cephalic, and is particularly ſaid to ſtrengthen the memory. It is often uſed as a corrective to purging medicines, and has the credit of being a great provocative to venery, eſpecially in the preſerved ſtate. It may be given in powders, from two or three to ten, twelve, or fifteen grains; but it is ſeldom given in ſuch large doſes, on account of its acrimony. It is uſed in decoctions from one dram to two or three, to the quart. It is an ingredient in the venice-treacle, mithridate, and diaſcordium, and in many other of the compoſitions of the ſhops; and is very frequently uſed in carminative and ſtomachic powders, in extemporaneous preſcription.

Method of preſerving GINGER. Waſh the ginger, and lay it to ſteep for ten or twelve days, in white-wine and water, ſtirring them every day; then to a pound of roots allow two quarts of white-wine, and about a pint of lemon juice; boil theſe together for about a quarter of an hour: then add two pounds and a half of fine ſugar, and boil it to a ſyrup, ſcumming it as it riſes; then ſet it by in a glazed pan till the next day, and afterwards boil it again in the ſyrup, for half an hour; then ſet it by till the next day, when boiling it again, let it cool; repeating this till the ginger is clear: after which put it into glaſſes, and cover them with paper.

This is a fine ſweet-meat for the winter-ſeaſon.

Ginger bread, a richer kind of bread, the flavour and taſte whereof are heightened and improved with ſpices, and particularly with ginger, whence the name.

The preparation of ginger-bread is as follows: grate two penny white loaves into two pounds of almonds well blanched and pounded; then add two ounces of ginger, finely ſcraped, liquorice, and aniſe ſeed in powder, of each half an ounce; add to theſe five or ſix ſpoonfuls of roſemary-water; and knead all into a paſte, with a pound of ſugar, mould it, and roll it thin, then print it, and dry it in a ſtove.

Others make it of treacle, citron, lemon, and orange-peel, with candied ginger, coriander, and carraway-ſeeds, mixed up with as much flour as will make it into a paſte.

Ginger-wine is made as follows: take three gallons of water, an ounce of rance-ginger, and three pounds of ſugar; boil them for an hour, and then put into it three lemons, and a little good yeaſt; cloſe up the veſſel, and let it ſtand five days: if it has ſo worked as to be clear in that time, it may be bottled; if not, let it ſtand longer, until it has worked ſufficiently; and in ten days after it may be drank.

GINGIVÆ, the gums, in anatomy, a hard ſort of fleſh, inveſting the alveoli, or ſockets of the teeth.

The gums conſiſt of the common membrane of the mouth, and the perioſteum of the jaws, to which they adhere very cloſely and firmly. They are furniſhed with a vaſt number of blood-veſſels, whence their florid red colour; and they ſerve for the covering of the jaws, and the keeping the teeth faſt in their ſockets.

GINGLYMUS, γιγγλυμος, one of the three ſubdiviſions of that kind of articulation called diarthroſis. See the articles Articulation and Diarthrosis.

The ginglymus is that juncture of the bones wherein they mutually receive and are received by one another, as is the caſe of the articulation of the humerus and cubitus. See Humerus, *&c.*

The ginglymus is again ſubdivided chiefly into three kinds; the firſt is when the ſame bone at the ſame extremity receives, and is reciprocally received by another bone, after the manner of an hinge, as that of the cubitus and humerus: the ſecond is when a bone receives another at one of its extremes, and is received into another, as the vertebræ do: the third is that where a bone is received into another after the manner of a wheel, or the axis of the wheel in a box, ſuch is that of the ſecond vertebra of the neck in the firſt.

GINSENG, in botany. See the article Panax.

The root of the ginſeng is of an oblong figure, never growing to any great ſize, being generally about four or five inches long, and its thickneſs that of one's little finger. It is of a firm texture, its ſurface is furrowed and wrinkled in different places. It is of a browniſh colour on the outſide, and ſomewhat yellowiſh within; and is ſo pure and fine, that it ſeems tranſparent. The top of the root, when it is ſent entire to us, is found compoſed of knots, or tubera, placed over one another in an irregular manner: theſe are formed of the bottoms of the decayed ſtalks of the ſeveral preceding years. When the root is fair and entire, it is eaſy to know by theſe how old it is; but very old roots not being ſo much in repute, the people who gather ginſeng have often the precaution to cut off ſome, or even all thoſe knobs, before they dry the root.

Ginſeng is of a very agreeable and aromatic ſmell, tho' not very ſtrong; its taſte is acrid and aromatic, and has ſomewhat bitter in it. It is to be choſen ſound and firm, moderately heavy, not too tough, and of a good ſmell. Before it be bought, it will be prudent to cut every root thro', for the Chineſe, of whom we have it, frequently find a way to introduce pieces of lead into it, to increaſe the weight.

The Chineſe and Tartars collect the root of this plant with infinite pains, at two ſeaſons of the year, ſpring and autumn. They are forbid to touch them with any iron inſtrument, ſo that they can only clean them with wooden knives. They waſh them in a decoction of millet-ſeed, and afterwards hang them over the fumes of the ſame liquor, which they boil in conſiderable quantities for that purpoſe, in a cloſe veſſel, in the upper part of which the root is ſuſpended, over the ſurface of the liquor: after this they dry it for uſe, thus it becomes tranſparent. The ſmall fibres which are taken off, they boil in water, and make an extract of them, which they uſe in the ſame intention with the root.

The Chineſe value the ginſeng ſo highly, that it ſells with them for three times its weight in ſilver. They, as well as the Aſiatics in general, think the ginſeng almoſt an univerſal medicine: they have recourſe to it in all diſeaſes, as the laſt remedy, and readily give themſelves over when it will not cure them; but the virtues moſt generally aſcribed to it, are thoſe of a reſtorative, a provocative, and a cordial. It is famous in the eaſt for giving ſtrength to thoſe who have diſabled themſelves by the too free uſe of women: there they alſo recommend it greatly in the ſmall-pox, fevers of all kinds, diſorders of the ſtomach and bowels, and tell us that diarrhœas and dyſenteries are cured by it: but they caution people not to give it in too large doſes to perſons of a florid ſanguine conſtitution, on whatever occaſion it may be neceſſary to them. The european phyſicians eſteem it a good medicine in convulſions, vertigoes, and all nervous complaints, and recommend it as one of the beſt reſtoratives known.

Its doſe is from ten grains to twenty, in powder; and from one dram to two to the pint, in infuſions.

GIOVENAZZO, a biſhop's ſee in the kingdom of Naples, twelve miles weſt of Barri.

GIRACE, a city and port-town of Calabria, about thirty-ſix miles north-eaſt of Reggio.

GIRANDOLE, a kind of branched candleſtick. See the article CANDLESTICK.

GIRDERS, in architecture, ſome of the largeſt pieces of timber in a floor.

Their ends are uſually faſtened into ſummers and breaſt-ſummers, and joiſts are framed in at one end to the girders.

The ſize of girders and ſummers, upon the rebuilding of London, were ordained by act of parliament, to be in length from ten to twenty-ſix feet, in breadth from eleven to ſeventeen inches, and in depth from eight to fourteen inches. It was alſo ordained by the ſame ſtatute, that no girder or ſummer ſhould be leſs than ten inches in the wall, and that their ends ſhould be laid in loam; as alſo that they be of good hearty oak, as free from knots as may be, becauſe that will be the leaſt ſubject to breaking, and may with more ſafety be relied on in this croſs and tranſverſe work.

GIRDING-GIRT, in the ſea-language. A ſhip is girt, or hath a girding-girt, when her cable being ſo tight, or ſtrained, upon the turning of the tide, ſhe cannot get over it, but lies acroſs the tide.

GIRDLE, *cingulum*, or *zona*, a belt or band of leather, or other matter, tied about the reins, to keep that part more firm and tight.

The Romans always wore a girdle, to tuck up the tunica, when they had occaſion to do any thing: this cuſtom was ſo general, that ſuch as went without girdles, and let their gowns hang looſe, were reputed idle diſſolute perſons.

It was antiently the cuſtom among us, for bankrupts and other inſolvent debtors to put off and ſurrender their girdle in open court; the reaſon whereof was, that our anceſtors uſed to carry all their neceſſary utenſils, as purſe, keys, &c. tied to the girdle: whence the girdle became a ſymbol of the eſtate.

Virgin-GIRDLE. It was the cuſtom among the Greeks and Romans, for the bridegroom to untie his bride's virgin-girdle, before he took her to his embraces. See the article BRIDEGROOM.

This girdle was made of ſheeps-wool; it was tied in the herculean knot, and in bed the huſband untied it, as a happy preſage of his having as many children as Hercules, who at his death left ſeventy behind him. The poets attribute to Venus a particular kind of girdle, capable of inſpiring the paſſion of love. See the article CÆSTUS.

Quickſilver-GIRDLE, *cingulum ſapientiæ*, in medicine, a ſort of belt or girdle, invented by Rulandus, made with woollen-cloth ſufficiently impregnated with quickſilver, killed with hog's lard.

This is ſewed up in a linen-cloth, which is applied to the ſkin, about the hypochondria, in diſorders of the itch, phthiriaſis, ulcers, and in caſes where there is no abſolute neceſſity for exciting a ſalivation. The patient's body muſt be kept warm, and defended from the cold of the external air, otherwiſe the belt, which is of itſelf highly ſafe, becomes very dangerous, as the acceſs of the external cold during its uſe, according to

Etmuller, endangers a ſalivation, petechial fever, or other diſorders. Bartholine informs us, that this girdle proves mortal, when applied to patients who are either too young, weakened by diſeaſes, or of a cacochymic habit of body.

Chriſtians of the GIRDLE, the chriſtians of Aſia, particularly thoſe of Syria and Meſopotomia, who to this day wear a large leathern girdle, being enjoined thereto by Motavakkel, tenth caliph of the family of the Abaſſides, in the year 856, as a badge of their profeſſion.

Order of the GIRDLE. See CORDELIER.

GIRDLE, in architecture. See CINCTURE.

GIRGE, a city of upper Egypt, on the weſt ſide of the Nile: eaſt lon. 32°, and north lat. 26°.

GIRKIN, a term uſed by gardeners for a ſmall kind of cucumber. See CUCUMBER.

GIRLE, among ſportſmen, denotes the roebuck in its ſecond year.

GIRONNE, a large city and biſhop's ſee of Spain, in the province of Catalonia, forty-five miles north-eaſt of Barcelona: eaſt lon. 2° 35′, and north lat. 42°.

GIRONNE′, or GIRONNY, in heraldry, a coat of arms divided into girons, or triangular figures, meeting in the center of the ſhield, and alternately colour and metal. See plate CXI. fig. 3.

GIRT, in the menſuration of timber, denotes the circumference of a tree. See the article TIMBER.

GIRT, among builders, a term ſometimes uſed for fillet. See the article FILLET.

GIRTHS *of a ſaddle*, the ſtrong canvas-ſtraps, which, being buckled under a horſe's belly, ſerve to fix the ſaddle. See the article SADDLE.

GISBORN, a market-town of Yorkſhire, fifty miles weſt of York.

GISBOROUGH, another market-town of Yorkſhire, thirty-ſeven miles north of York.

GISON, or GEISON, in jewiſh antiquity, ſignifies, according to Joſephus, a little wall, about breaſt high, made round the temple of Jeruſalem, and round the altar of burnt ſacrifices, to keep the people at a diſtance. This author, in his books of antiquities, makes the giſon three cubits high, and but one in his hiſtory of the jewiſh war.

GISORS, a city of Normandy, in France, twenty-eight miles ſouth eaſt of Rouen: eaſt lon. 1° 25′, north lat. 50° 10′.

GIVEN, among mathematicians and philoſophers, the ſame with data. See the article DATA.

GIVET, a town of the biſhopric of Liege, twenty miles ſouth of Namur.

GIUSTANDIL, a town of european Turky, in the province of Servia: eaſt long. 24°, north lat. 43°.

GIULA, a city of Hungary, ſubject to the houſe of Auſtria: eaſt long. 21° 35′, north lat. 46° 38′.

GLABELLA, in anatomy, the name by which ſome call the ſpace between the eye-brows, as being ſmooth and void of hair.

GLACIS, in building, an eaſy, inſenſible ſlope, or declivity.

The deſcent of the glacis is leſs ſteep than that of the talus. In gardening, a deſcent ſometimes begins in talus, and ends in glacis. See the article TALUS.

The glacis of the corniche, is an eaſy imperceptible ſlope in the cymatium, to promote the deſcent and draining off the rain-water.

GLACIS, in fortification, that maſs of earth which ſerves as a parapet to the covered way, ſloping eaſily towards the champaign, or field.

The glacis, otherwiſe called eſplanade, is about ſix feet high, and loſes itſelf by an inſenſible diminution in the ſpace of ten fathoms. See ESPLANADE.

GLADE, in gardening and agriculture, an opening and light paſſage made through a wood, by lopping off the branches of trees along that way.

GLADIATORS, in antiquity, perſons who fought generally in the arena at Rome, for the entertainment of the people.

The gladiators were uſually ſlaves, and fought out of neceſſity; though ſometimes freemen made profeſſion thereof, like our prize-fighters, for a livelihood. The Romans borrowed this cruel diverſion from the Aſiatics; and we find that the very prieſts had their ludi pontificales, and ludi ſacerdotales. As from the earlieſt ages of antiquity we read that it was cuſtomary to ſacrifice priſoners of war to the manes of the great men that fell in the engagement, in proceſs of time, they came to ſacrifice ſlaves at the funerals of all perſons of condition; but as it would have appeared barbarous to cut their throats like beaſts, they were appointed to fight with each other, and to do their beſt to ſave their own lives by killing their adverſary. See the article BUSTUARII.

Hence aroſe the maſters of arms called laniſtæ, and men learned to fight. Theſe laniſtæ bought ſlaves to train up to this cruel trade, whom they afterwards ſold to ſuch as had occaſion to exhibit ſhews. Junius Brutus, who expelled the kings, was the firſt that honoured the funeral of his father with theſe inhuman diverſions at the ſepulchre of the deceaſed; but afterwards they were removed to the circus and amphitheatres; and other perſons, beſides ſlaves, would hire themſelves to this infamous office.

They were all firſt ſworn that they would fight till death, and if they failed, they were put to death either by fire, ſwords, clubs, whips, *&c.* It was uſual with the people, or emperor, to grant them life when they ſhewed no ſigns of fear. Auguſtus decreed, that it ſhould always be granted them.

From ſlaves and freed men, the wanton ſport ſpread to perſons of rank, as we find in Nero's time. And Domitian exhibited combats of women in the night-time: we alſo read, that dwarfs encountered with one another. Conſtantine the great firſt prohibited theſe combats in the eaſt, but the practice was not intirely aboliſhed in the weſt before Theodoric king of the Oſtrogoths, in the year 500.

When any perſon deſigned to entertain the people with a ſhow of gladiators, he ſet up bills in the public places, giving an account of the time, the number and names of the combatants, and the circumſtances whereby they were to be diſtinguiſhed; each having his ſeveral badge, which generally was a peacock's feather: they alſo gave notice what time the ſhow would laſt; and ſometimes gave repreſentations of theſe things in painting, as is practiſed among us, by thoſe who have any thing to ſhow at fairs, *&c.* Upon the day appointed for the ſhow, in the firſt place the gladiators were brought out all together, and obliged to take a circuit round the arena in a very ſolemn and pompous manner. After this, they proceeded, *paria componere*, to match them by pairs, in which great care was taken to make the matches equal. The firſt ſort of weapons they made uſe of were ſtaves, or wooden files, called rudes, and the ſecond were effective weapons, as ſwords, poniards, *&c.*

The firſt were called arma luſoria, or exercitoria; the ſecond, decretoria, as being given by decree or ſentence of the prætor, or of him at whoſe expence the ſpectacle was exhibited. They began to fence or ſkirmiſh with the firſt, which was to be the prelude to the battle, and from theſe, when well warmed, they advanced to the ſecond, with which they fought naked. The firſt part of the engagement was called *ventilare, præludere*; and the ſecond *dimicare ad certum*, or *verſis armis pugnare.*

When any received a remarkable wound, either his adverſary or the people uſed to cry out, *habet*, or *hoc habet.* If the vanquiſhed ſurrendered his arms, it was not in the victor's power to grant him life: it was the people during the time of the republic, and the prince or people during the time of the empire, that were alone empowered to grant this boon. The two ſigns of favour and diſlike given by the people, were *premere pollicem*, and *vertere pollicem*, the former of which M. Dacier takes to be a clenching of the fingers of both hands between one another, and ſo holding the two thumbs upright cloſe together, was a ſign of the people's admiration of the courage ſhewn by both combatants; and at the ſame time for the conqueror to ſpare his antagoniſt's life: but the contrary motion, or bending back of the thumbs, ſignified the diſſatisfaction of the ſpectators, and authoriſed the victor to kill the other combatant downright for a coward. The emperor ſaved whom he liked, if he was preſent at the ſolemnity, in the ſame manner.

After the engagement, ſeveral marks of favour were conferred on the victor, particularly a branch of palm-tree; and oftentimes a ſum of money, perhaps gathered up among the ſpectators: but the moſt common rewards were the pileus and the rudis; the former being given only to ſuch gladiators as were ſlaves, for a token of obtaining their freedom; but the rudis ſeems to have been beſtowed both on ſlaves and freemen, with this difference, that it procured the former no more than a diſcharge from any further performance in public, upon which they commonly turned laniſta: but the rudis, when given to ſuch perſons as, being free, had hired themſelves out for theſe ſhows, reſtored them to a full enjoyment of their liberty. See the articles PILEUS, RUDIS, and LANISTA.

There were divers kinds of gladiators diſtinguiſhed by the weapons, manner, time of fighting, *&c.* ſuch were the andabatæ, catervarii, conſummati, cubicularii, dimachæ, fiſcales, &c.

GLADIOLUS, *gladiole*, in botany, a genus of the triandria-monogynia claſs of plants, the flower of which conſiſts of ſix petals that unite at their baſes: the fruit is an oblong, trilocular capſule, containing a great many triangular ſeeds.

The root of gladiole, or the common corn flag, is accounted diſcutient, and good in malignant and peſtilential caſes.

GLADIUS, a ſword; whence *jus gladii*, or right of the ſword, is uſed in our antient latin authors, and in our norman laws, for ſupreme juriſdiction: and it is probably from hence that, at the creation of an earl, he is *gladio ſuccinctus*, to denote his having a juriſdiction over the county.

GLAMA, a ſpecies of peruvian camel, with the back even, and the breaſt gibboſe. See the article CAMEL.

GLAMORGANSHIRE, a county of ſouth Wales, bounded by Brecknockſhire on the north, and by the Briſtol channel on the ſouth. Its capital is Landaff.

GLAND, in anatomy, a ſmall body, formed by the interweaving of veſſels of every kind, covered with a membrane, uſually provided with an excretory duct, and deſtined to ſeparate ſome particular fluid from the maſs of blood, or to perfect the lymph. See BLOOD and LYMPH.

Many of the anatomical writers of the very firſt claſs, and among theſe ſome who have written profeſſedly of the glands, and have made it their peculiar buſineſs to examine nicely into their nature, and explain their ſtructure, have yet, from mere difficulty of aſcertaining adequate ideas of the term, evaded giving a definition or general deſcription of the glands; and in conſequence of this, numberleſs errors, and an almoſt inextricable confuſion, has crept into the ſtudy of this important part of the human ſtructure.

Other authors, who have had more boldneſs, if not greater abilities than thoſe who have avoided meddling with definitions of theſe parts, have ventured to eſtabliſh what they call glands: but theſe differ ſo much from one another in what they would eſtabliſh as general certainty, and have produced ſuch imperfect and erroneous definitions, that they have all either included parts which themſelves own not to be glands in the definition, or they have limited the term to ſome particular ones, and excluded what themſelves and every body elſe allow to be glands out of the number.

Glands are parts of a peculiar ſtructure: they are of various figures, colours, and conſiſtencies, as they are deſtined to different offices. The antients ſuppoſed them formed of a different kind of fleſh, from that of the reſt of the body; but the parts to which they have given the name of glands, though they are as different from one another as poſſible in figure, ſize, and colour, yet they are eaſily known, and diſtinguiſhed as glands by all the world; notwithſtanding the difficulty of giving a definition or even a general character of a gland, which ſhall include all the true glands, and take in no other parts of the body with them.

Many writers on this ſubject have aſſerted, that wherever there is a ſecretion of any kind performed, there is a gland; but this is not true, for there are many ſecretions performed in the body, and thoſe even of the largeſt and moſt important kind, where there are no glands to perform them: the chyle is ſecreted in the inteſtines without the aſſiſtance of glands; the ſemen is ſecreted in the teſticles; and the pituita in the pituitary ſinuſes of the brain, where there are no glands at all. On the other hand alſo it is to be obſerved, that there are glands received and allowed by all writers as ſuch, which do not appear to perform any ſecretions at all; and the antients themſelves agreed in giving the name of glands to ſeveral parts, though they were not aſſured that they ſecreted any thing, nor even in ſome caſes believed that they did. But Mery, in ſeveral papers in the Memoirs of the Paris Academy, not only proves that all the ſecretions are not performed by means of glands, but that many of the ſecretions of moſt importance to the body are performed without glands. We are to add alſo, that every beginner in anatomy, at this time, knows a gland to be ſuch when he ſees it, without knowing any thing of its uſe. There are therefore other characters by which a gland may be known, though by its office and uſe it cannot.

Other writers, of the number of whom is the great Malpighi, in diſſections of particular bodies, having found veſicles in the brain, liver, kidneys, and other parts of the body, thence declared them to be glandulous in their ſtructure: but in theſe caſes, the bodies diſſected were all morbid ones; and as the ſame veſicles are not found in healthful ones, nor indeed any thing analogous to them, it is a ſufficient proof that they are not natural parts of their ſtructure; and beſides, veſicles and glands are different. See VESICULA.

It is evident that the antients called certain parts of the human body glands, and that for no other reaſon but becauſe they found them compoſed of a peculiar kind of fleſhy ſubſtance, of a peculiar habit, or external appearance, without paying any the leaſt regard either to their internal ſtructure, their ſpherical figure, (by which character ſome define them) or their uſe.

If it be aſked, ſays Heiſter, what this particular habit in the glands is? or how we are to know it? the anſwer is, that the peculiar complication and arrangement of the veſſels, from which there ariſes a form obviouſly diſtinguiſhable at ſight from the muſcles, the fat, the bones, the membranes, the veſſels, and in fine from every other part of the human fabric, which gives a ſufficiently certain, determinate and ſtriking notice of it.

The differences of the glands among themſelves, as eſtabliſhed by many authors, are very numerous: it will not be neceſſary to run into the whole diſquiſition; we ſhall only ſelect a few which are more generally eſtabliſhed than the reſt, and of more immediate and real uſe. We ſhall firſt divide them into two general kinds, the ſimple, called alſo conglobate glands, and the conglomerate. See the articles CONGLOBATE and CONGLOMERATE.

The glands differ alſo greatly in regard to their conſiſtence: ſome of them are conſiderably hard and firm, and others extremely ſoft and tender: of the latter kind in particular are the glands ſituated in the articulations of the bones of the ſeveral parts of the body.

They differ alſo very conſiderably in colour. Some of them are of a pale, whitiſh, red, or fleſhy colour; others of a ſtrong, deep red; others yellowiſh, or browniſh, and ſome evidently blackiſh.

Their differences in figure are as conſiderable alſo as thoſe in colour: ſome of them are round, others oval, others oblong, and many others of figures as different as well can be from any one of thoſe regular ones: the pancreas, the thyroide, and the thymus, are inſtances of this: ſome of them have obtained their names from their peculiar figure: of this number are the glandula-pinealis, the miliares, and others. See the articles PANCREAS, THYROIDE, THYMUS, *&c.*

The uſes of the GLANDS are alſo as different as their colours or figures: ſome of them are ſalival, mucoſe, and lymphatic; others are mucilaginous, ſebaceous, and waxy; others lachrymal, pituitary, *&c.* and from theſe their ſeveral contents or ſecretions, they are termed lachrymal, *&c.* See the articles SALIVAL, LYMPH, MUCILAGINOUS, *&c.*

The ſituation of the GLANDS is another article in which they differ, and from which many of them have their ſeveral names; ſuch are the parotides, maxillares, linguales, thyroide, palatine, labial, jugular, cervical, axillary, inguinal, lumbary, inteſtinal, meſenteric, renal, *&c.* See the articles PAROTIDES, MAXILLA, *&c.*

And, finally, the ſize of the glands is a thing in which they differ moſt obviouſly and eſſentially.

Of the GLANDS *in particular.* The particular glands of the body, or ſuch as are truly and properly of this denomination, are, according to Heiſter, as follow; and firſt of the glands of the head.

In the ſinuſes of the dura mater, and out of them, at the ſides, there are found a number of ſmall glands deſcribed by Pacchonius; and there are ſometimes others viſible in the foveæ of the os frontis, and about the diviſions of the veſſels, between the dura mater and the arachnoides. Theſe glands ſeem deſtined for the ſecreting of a fluid to moiſten the dura mater. Other glands of the brain are the pineal gland, and the pituitary gland. See the articles PINEAL, PITUITARY, DURA MATER, and BRAIN.

In the exterior part of the head, that is, out of the cavity of the ſkull, we have the parotids, the maxillary glands, the ſublinguals, the linguals, the labials, the palatine, and the buccinals, which are diſtributed here and there about the membrane of the mouth; and are each deſcribed in their places. In the orbit alſo there is the lachrymal glands; under the eye-lids are the ceraceous or ſebaceous glands, the tonſils in the fauces, the mucoſe glands in the pituitary membrane of the noſtrils, and the ceruminoſe glands of the ears, each of which are deſcribed under their ſeveral heads. See the articles EYE and EAR.

The principal gland of the neck is the thyroides, beſides which there are alſo found in the neck a great number of leſſer ones, diſtributed here and there among the muſcles and fat. Their figure, their number, and their ſituations, vary in different ſubjects; but in general thoſe in the anterior part of the neck are called jugulars; and thoſe in the hinder part, occipitales and cervicales. The uſe of theſe is hitherto uncertain; it is generally ſuppoſed that they are of ſervice to the lymphatic veſſels, but what ſort of uſe they can be of to them, does not ſo eaſily appear. See the articles THYROIDE, JUGULAR, CERVICAL, and NECK.

Ruyſch and Morgagni have alſo deſcribed and figured glands in the epiglottis: and Morgagni has deſcribed others in the other parts of the larynx, particularly about the arytænoide cartilages, as alſo in the trachea: but theſe are often ſo ſmall, that they are ſcarce diſcoverable in diſſection.

The oeſophagus, eſpecially towards its upper part, has a great number of glands; and it is common to find a little aperture or oſculum in the center of each, which has much the appearance of an excretory duct.

In the thorax we meet with the gland thymus; as alſo with the glandulæ bronchiales: theſe laſt are very obſervable glands, ſituated externally in the larger diviſions of the trachea and bronchia. They are of a blackiſh colour; and their uſe like that of many others of the glands of this part of the body, is yet very little known. It had been long ſuppoſed that they ſerved to ſecrete a liquid which they diſcharged into the bronchia, for the lubricating and moiſtening theſe parts; but Vercellonius will have it, that they ſecrete a fluid whoſe uſe is to be aſſiſtant in the digeſtion of our food, and that they diſcharge it into the oeſophagus through certain extremely minute ducts. See the articles THORAX, THYMUS, BRONCHIA, *&c.*

About the fifth vertebra of the back, there is ſometimes found in the thorax a remarkable gland adhering to the poſterior part of the oeſophagus: this is uſually called glandula dorſalis. It is, in different ſubjects, of various ſizes. It is often of the ſize of a kidney-bean; ſometimes of that of an almond, and ſometimes conſiderably larger; in others, it is much leſs than the ſmaller, and ſometimes, it is wholly wanting; or at leaſt ſo extremely minute and inconſiderable, that the beſt diſſectors are not able to find it. Sometimes alſo two glands are found in this part in the place of one. Vercellonius is of opinion, that this gland is alſo placed there for the ſecretion of a fluid ſerving to aſſiſt the digeſtion of our food in the ſtomach: but Fantonus, and ſome others, ſuppoſe, that theſe glands diſcharge a fluid of a mucous nature into the cavity of the oeſophagus: ſeveral authors affirm, that in dogs theſe glands are found tumid, and inhabited by a number of oblong and ſlender red worms. See DORSUM, VERTEBRÆ, and OESOPHAGUS.

In the abdomen there are very conſiderable numbers of glands: the largeſt of them is the pancreas; after this in ſize come the glandulæ renales, or capſulæ atrabilariæ; after theſe the maſeriacs, and the inteſtinals of Brunner and Peyer in the inteſtines. See ABDOMEN, *&c.*

The glands of the ſtomach are very eaſily diſtinguiſhable in dogs and hogs; but in human ſubjects, it is difficult to find them: many anatomiſts have doubted them. Morgagni, however, diſcovered them ſo fairly in human ſubjects, that there is no doubt left about them.

About the vertebra of the loins, near where the receptaculum chyli is ſituated, and about the os ſacrum, and the diviſions of the iliac veſſels, are many glands of various ſizes and figures: they are commonly called lumbares, ſacræ, and iliacæ, and they have numerous lymphatics entering into them, and diſcharging their contents into the receptaculum chyli. The lumbar glands have been ſometimes found ſwelled to the bigneſs of a man's fiſt.

In the concave part of the liver, about the ingreſs of the vena portæ and the neck of the gall-bladder; as alſo about the ſpleen, near the ingreſs of the veſſels, there are frequently found conglobate glands, of about the bigneſs of a kidney-bean: theſe are called by authors hepatic glands, cyſtic glands, and by other names formed from the names of the parts they are near; and they ſeem to ſerve the lymphatic veſſels. See LIVER.

About the left orifice of the ſtomach, there ſometimes alſo is found, according to Vercellonius, a gland which he ſays is equal to a kidney-bean in ſize; he alſo ſays that it has ducts opening into the cavity of the ſtomach. In hogs this gland is very conſpicuous, but in human ſubjects it is not ſo.

Many authors have told us, that in the omentum, in every part where the fat lies, there are a number of glands whoſe office it is to ſecrete it. Diſſection ſhews us a few about that part where it is joined to the pylorus; and as to the reſt, it is not neceſſary that there ſhould be glands, becauſe there is fat: for that may be, and is, indeed, in great abundance ſecreted immediately from the arteries.

In the gall-bladders of oxen there are often found a number of ſmall glands of a yellow colour, not unlike the ceruminous glands in the auditory paſſage. In human ſubjects the ſame kind of glands are alſo ſometimes found. The bladder and the ureters have alſo ſometimes a number of ſmall glands, but they are very indeterminate in number and ſize, and are not always indeed found in the ſame place, eſpecially about the ureters. Thoſe about the bladder are uſually ſituated towards the neck of it, and are ſometimes tolerably conſpicuous.

In the parts of generation of man there occur, 1. The glandulæ Cowperi. 2. The glandulæ Littri. And, 3. The odoriferous glands of Tyſon. See PENIS. As to the latter ones, thoſe of them which are ſituated in the interior part of the prepuce, are much more obvious than thoſe about the coronæ penis, where it is very difficult to diſtinguiſh them from the nervous papillæ of the ſame part. 4. We meet with the proſtatæ. 5. The glands of the veſiculæ ſeminales: but theſe are rarely ſeen diſtinct. Terraneus alſo deſcribes ſix ſmall glands in the urethra virilis. See the articles PREPUCE, PROSTATÆ, VESICULA, and URETHRA.

In the parts of generation in women, we are to refer to the number of the glands, 1. Thoſe which Morgagni diſcovered in the nymphæ: theſe have a very near alliance with the glandulæ odoriferæ of the penis in men. 2. Authors tell us of glands in the female as well as the male urethra: but the diſſector will find only little foramina and ducts in the place of them. 3. About the extremity of the urethra, however, in the vagina, there are ſometimes found evident glands, ſituated beneath them: theſe as well as the glands of the nymphæ, are often very turgid in the time of parturition. 4. The veſicles ſometimes met with near the internal orifice of the uterus, and taken by ſome for a new ovary, are not properly glands, tho' ſome people have been very poſitive that they were ſuch; having nothing of the habit and peculiar appearance of glands, and being in truth only veſicles. 5. Some have alſo maintained that there are glands in the uterus, by which the menſtrual diſcharges are ſecreted; but this notion ariſes only from the falſe hypotheſis, that where there are no glands, there can be no ſecretion. See the articles VAGINA and UTERUS.

Among the glands which belong to the articulations, and the extremities, we are to mention firſt the axillary ones. 2. The inguinal glands; theſe laſt, being ſituated on each ſide in the groin near the crural veſſels, are in various diſeaſes apt to grow tumid, and inflamed. Abſceſſes ore often formed in them; but their uſe in the body is not eaſily underſtood. 3. The glands, called from their diſcoverer glandulæ Harveianæ, in the articulations: they are alſo called from the matter they ſecrete glandulæ mucoſæ. Theſe are the ſofteſt of all the glands in the body; they ſecrete a mucous ſoft fluid, which ſerves to lubricate the joints, and render their motions eaſy, and to prevent their growing dry, and cohering together.

About the ſcapula, the flexure of the elbow, the hand, the knee, and the foot, there are alſo found here and there ſome ſmall glands; as alſo in ſome places between and among the muſcles; but as their number and ſituation, as well as their ſize and figure, are very uncertain and variable, it is not neceſſary to recount them here.

We are, however, yet to ſpeak of the cutaneous glands. Verheyen tells us, that Steno had diſcovered, that there is a gland ſituated under every diſtinct pore of the ſkin, from whence there ariſes a veſſel for the conveyance of the matter of ſweat, which terminates at the ſurface of the cutis: and hence Verheyen, though he does not ſay that he had ever ſeen any of theſe glands himſelf, ventures to give them a place among the parts he deſcribes; and calls them ſubcutaneous glands. The pores of the ſkin are ſo extremely numerous, that if, according to theſe authors, there were a gland belonging to every one of them, the glands muſt be almoſt infinite in number. But in diſſection, when the cutis has been carefully cleared from the fat that is under it, it is certain no ſuch glands are ſeen, either in the ſeparated fat, or on the lower ſurface of the cutis: there are indeed always found little portions of the fat here and there inſinuating themſelves into the little foveolæ, or holes in the cutis; but pieces of fat will be diſtinguiſhed from glands, with very little difficulty by an expert anatomiſt. From this, and from innumerable ſearches after theſe glands, it appears, that there are indeed no ſuch glands as thoſe called ſubcutaneous. See the article CUTIS.

Indurations of the GLANDS. Indurated ſwellings of the glands from viſcid humours, which at length turn callous and cancerous, ariſe from an obſtruction of the veſſels, eſpecially in the glands, and from thick groſs humours. They are known from hard tumours, which are generally moveable and indolent; in this ſtate they are called indurated glands; and if they do not digeſt and ſuppurate in a ſhort time, they grow harder, and are called ſcirrhous glands; and if theſe, eſpecially in the breaſts, begin to corrode and are painful, they are termed carcinomata, or incipient occult cancers. See the articles SCIRRHUS and CANCER.

The indurated glands of the neck in boys proceed from voracity and a bad diet, which, according to Heiſter, are to be cured by correcting the corrupt humours, by external exerciſe, by the force of nature, and a length of time: when this is not performed, and they increaſe and multiply, they become ſcrophulous, and are called the king's evil; when they are large, they are called ſtrumæ: but theſe are ſeldom indurated glands, but rather tunicated humours, which contain various bad humours in bags, and increaſe to a wonderful ſize, inducing different grievous evils. See the articles, DIET, EXERCISE, SCROPHULA, CYST, TUMOUR, *&c.*

It is cuſtomary to attempt the cure by various external remedies, but theſe are ſcarcely ſufficient, without correcting the intemperies of the humours; for otherwiſe they generally grow worſe. The remedies for indurated glands are emollients and diſſolvents; ſuch as the infuſions and decoctions of reſolving roots, woods, and herbs, taken twice or thrice a day; ſuch as the roots of ſarſaparilla, with guaiacum; of the roots of ſarſaparilla, china, and ſaſſafras-wood; or of the roots of ſcrophularia or vincetoxicum; likewiſe a decoction of guaiacum, with liquorice-root, with the infuſion and decoction of roſemary with ſugar. See the articles EMOLLIENTS, DISSOLVENTS, *&c.*

Beſides theſe, ſuch powders as attenuate the viſcid blood, ſuch as the pulvis ad ſtrumas, of the auguſtan diſpenſatory, to which may be added a grain of cinnabar or mercurius dulcis; likewiſe the crude powder of antimony, eſpecially with a grain of mercurius dulcis in every doſe, which is very uſeful in diſſolving the glands in the neck of boys. The powder of millepedes, from half a ſcruple to a ſcruple, with a grain of mercurius dulcis, is an approved remedy in this caſe, and in hard tumours of the viſcera. Some greatly praiſe ethiops mineral: which remedies are to be continued a long while. As to diet, all auſtere, crude, groſs flatulent aliment is to be avoided; winter potherbs, pulſe, and the like. The quantity of food ſhould likewiſe be leſſened, cold unwholſome air avoided, as well as ſadneſs and reſt; externally, ſimple ſpirit of wine applied hot, or camphorated with a little ſaffron; likewiſe reſolvent plaſters with mercury, as alſo digeſtive bags of fragrant herbs and flowers. Dedier greatly recommends hot ſea-ſand applied to ſcirrhous breaſts. Some commend oil of bricks and the balſam of ſulphur of Rulandus, if rubbed often in a day therewith; in the room of which may be applied a diſtilled oil of ſoap, petroleum, dog's fat, and the martial ointment; after which a plaſter of gum-ammoniac, or ſoap, or melilot, or ſperma ceti muſt be laid thereon; when the tumour is ſoftened, a plaſter of oxycroceum may be properly uſed.

But when the ſalival, maxillary, or parotid glands are indurated, and the ſeveral remedies already mentioned prove unſucceſsful, in order to preſerve the patient from otherwiſe inevitable deſtruction, the dangerous operation of extirpating theſe glands muſt be attempted, in which great care and attention is required, as they adhere to conſiderable branches of the carotid artery; and that, in extirpating them, the patient may bleed to death, if not prevented by the hand of a ſkilful operator. For the operation Heiſter directs, that the ſurgeon be firſt provided with a good ſtyptic-liquor, with a large quantity of lint, linen rags, a puff ball, as alſo ſome thick compreſſes, each larger than the other, and a roller of about ſix ells long: theſe being provided, the patient is to be ſeated in a proper light, with his head and hands ſecured by aſſiſtants; then the ſurgeon opens the integuments by a longitudinal inciſion, and, freeing them carefully from the tumour, divides their connecting arteries; hereupon the blood ruſhes forth ſo impetuouſly, that near a pound will be loſt, before the ſurgeon can lay down his knife, and apply the dreſſings; therefore, to ſave the patient, and ſuppreſs the hæmorrhage, he muſt conſtantly apply a bundle of the linen-rags, dipped in ſtyptic, and preſs them cloſe upon the divided arteries: the remaining cavity of the wound muſt be well filled with dry lint and rags, preſſed cloſe with his fingers, over which muſt be impoſed a large piece of puff-ball, with three or four compreſſes, each larger than the other; the whole being at laſt ſecured by the faſcia nodoſa, commonly uſed for arteriotomy in the temples: laſtly, it is to be obſerved, that when the tumour is uncommonly large, it may be more convenient to make a cruciform inciſion thro' the integuments, by which the tumour may be extracted more eaſily than by a longitudinal one. See STYPTIC, BANDAGE, CYST, TUMOUR, *&c.*

For the treatment of the wound, ſee the article WOUND.

With regard to the uſe of ſea-water in diſorders of the glands, ſee the article SEA.

GLANDERS, in the manege, a diſeaſe in horſes, conſiſting of a thick, ſlimy, corrupt humour, running from the noſtrils, of a different colour, according to the different degrees of malignity, or as the infection has been of a ſhorter or longer continuance; being white, yellow, green, black, or bloody.

Authors aſcribe this diſeaſe to various cauſes: ſome to infection; others, to a diſorder of the lungs; others, to the ſpleen; ſome to the liver; and others, to the brain. After it has been of ſo long a ſtanding, as that the mater is become of a blackiſh colour, which is uſually in its laſt ſtage, they ſuppoſe it to come from the ſpine; and hence they call it the mourning of the chine.

Kernels and knots are uſually found under the caul in this diſorder; and as theſe grow bigger and more inflamed, ſo the glanders increaſe more.

For the cure of the glanders, Mortimer gives the following receipt.

Take a pint of children's chamber lye, two ounces of oil of turpentine; half a pint of white wine vinegar; four ounces of flower of brimſtone; half a handful of rue: boil this compoſition till it comes to a pint, and give it to the horſe faſting; and let him faſt after it ſix hours from meat, and twelve from water.

GLANDIVES, a city and biſhop's ſee of Provence, in France, ſituated on the river Var, twenty-ſix miles north-weſt of Nice: eaſt long. 6° 40′, north lat. 44°.

GLANDULAR, or GLANDULOUS, among anatomiſts. See GLANDULOUS.

GLANDULE, GLANDULA, a term uſed by anatomiſts to expreſs a ſmall gland. See the article GLAND.

GLANDULOUS, ſomething abounding with or partaking of the nature of glands. See the article GLAND.

GLANDULOUS BODY, *glanduloſum corpus*, a name by which ſome call the proſtatæ. See the article PROSTATÆ.

GLANDULOUS ROOTS, among gardeners, *&c.* denotes ſuch tuberoſe ones as are connected together by ſmall fibres. See the article ROOT.

GLANS, ACORN, in natural hiſtory. See ACORN.

GLANS, in anatomy, the anterior extremity of the penis, called by other different names, as the head of the penis, the nut of the penis, and the balanus of the penis. See the article PENIS.

The glans is compoſed of the epidermis and the corpus cavernoſum, which is continuous with the urethra. See the articles EPIDERMIS and CORPUS, *&c.*

Its ſurface is very ſmooth and poliſhed, and is very ſenſible to the touch, which is owing to a multitude of nervous papillæ diſtributed all over it; and are moſt obvious when the penis is erected. In the front of it is the urethra, and immediately under is inſerted the frænum or frenulum of the penis. The poſterior extremity of the glans, with its neck behind, is diſtinguiſhed by the name of the corona. See article CORONA.

GLANS is alſo uſed to denote the tip or extremity of the clitoris, from its reſemblance both in form and uſe to that of the penis. The principal difference conſiſts in this, that it is not perforated as is the glans of the penis. This glans is alſo covered with a preputium formed of the inner membrane of the labia. See the article CLITORIS.

GLANS is alſo taken for ſtrumous, or ſcrophulous tumors.

It alſo ſignifies a ſuppoſitory, or peſſary.

GLARIS, the capital of one of the cantons of Switzerland, of the ſame name, the inhabitants of which are both proteſtant and popiſh: it is ſituated thirty-five miles ſouth-eaſt of Zurich, in eaſt long. 9°, and north lat. 47°.

GLASGOW, a large city of Scotland, ſituated in Lanerkſhire, or Clydeſdale, on the river Clyde, twenty miles north-weſt of Lanerk, and forty miles weſt of Edinburgh, in 4° 8′, weſt long. and 55° 5′, north lat.

This is one of the moſt elegant towns in Scotland. It has an univerſity, and a good foreign trade.

GLASS, *vitrum*, a tranſparent, brittle, factitious body, produced by the action of fire upon a fixt ſalt and ſand, or ſtone, that readily melts.

The chemiſts hold, that there is no body but may be vitrified, or converted into glaſs; being the laſt effect of fire, as all its force is not able to carry the change of any natural body beyond its vitrification.

Antiquity and hiſtory of GLASS. When, or by whom, the art of making glaſs was firſt found out is uncertain: ſome will have it invented before the flood; but without any proof. Neri traces the antiquity of this art as far back as the time of Job: but Dr. Merret will have it as antient as either pottery, or the making of bricks: becauſe that a kiln of bricks can ſcarce be burnt, or a batch of pottery be made, but ſome of the bricks and the ware will be at leaſt ſuperficially turned to glaſs; ſo that it muſt have been known at the building of Babel, and as long before as the making of bricks was uſed. It muſt have been known, conſequently, among the Egyptians, when the Iſraelites were employed by them in making bricks. Of this kind, no doubt, was that foſſil glaſs mentioned by Ferrant. Imperat. to be found under-ground in places where great fires had been. The Egyptians indeed boaſt, that this art was taught them by the great Hermes. Ariſtophanes, Ariſtotle, Alexander Aphrodiſæus, Lucretius, and John the divine, put us out of all doubt that glaſs was in uſe in their days.

Pliny relates, that it was firſt diſcovered accidentally in Syria, at the mouth of the river Belus, by certain merchants driven thither by a ſtorm at ſea, who, being obliged to continue there, and dreſs their victuals, by making a fire on the ground, where there was great plenty of the herb kali; that plant burning to aſhes, its ſalts mixed and incorporated with ſand, or ſtones fit to vitrify, and produced glaſs: that this accident being known, the people of Sidon, in that neighbourhood, aſſayed the work, improved the hint, and brought it into uſe; and that this art has been improving ever ſince.

Venice, for many years, excelled all Europe in the fineneſs of its glaſſes; but of late the French and Engliſh have excelled the Venetians, ſo that we are no longer ſupplied with this commodity from abroad.

Nature and characters of GLASS. Naturaliſts are divided in what claſs of bodies to rank glaſs: ſome making it a concrete juice; others a ſtone; others again rank it among ſemi-metals; but Dr. Merret obſerves, that theſe are all natural productions, whereas glaſs is a factitious compound, produced by fire, and never found in the earth, but only the ſand and ſtone that form it; that metals are formed by nature into certain ſpecies; and that fire only produces them, by its faculty of ſeparating heterogeneous, and uniting homogeneous bodies: whereas it produces glaſs, by uniting heterogeneous matter, *viz.* ſalt and ſand, of both which it evidently conſiſts; 100 lb. weight of ſand yielding above 150 lb. of glaſs. The ſame learned doctor gives us a preciſe and accurate enumeration of the ſeveral characters, or properties of glaſs, whereby it is diſtinguiſhed from all other bodies, *viz.* 1. That it is an artificial concrete of ſalt and ſand, or ſtones. 2. Fuſible by ſtrong fire. 3. When fuſed, tenacious and coherent. 4. It does not waſte nor conſume in the fire. 5. When melted, it cleaves to iron. 6. When it is red hot, it is ductile, and may be faſhioned into any form; but not malleable; and capable of being blown into a hollowneſs, which no mineral is. 7. Frangible when thin, without annealing. 8. Friable, when cold. 9. Diaphanous, whether hot or cold. 10. Flexible and elaſtic. 11. Diſſoluble by cold and moiſture. 12. Only capable of being graven or cut with a diamond, or other hard ſtone, and emery. 13. Receives any dye or colour both externally and internally. 14. Not diſſoluble by aqua-fortis, aqua regia, or mercury. 15.

Fig. 1. GAZELLA.

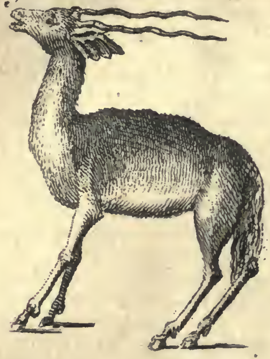


Fig. 2. GEOCENTRIC.

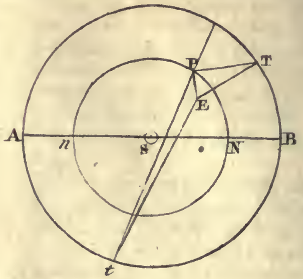
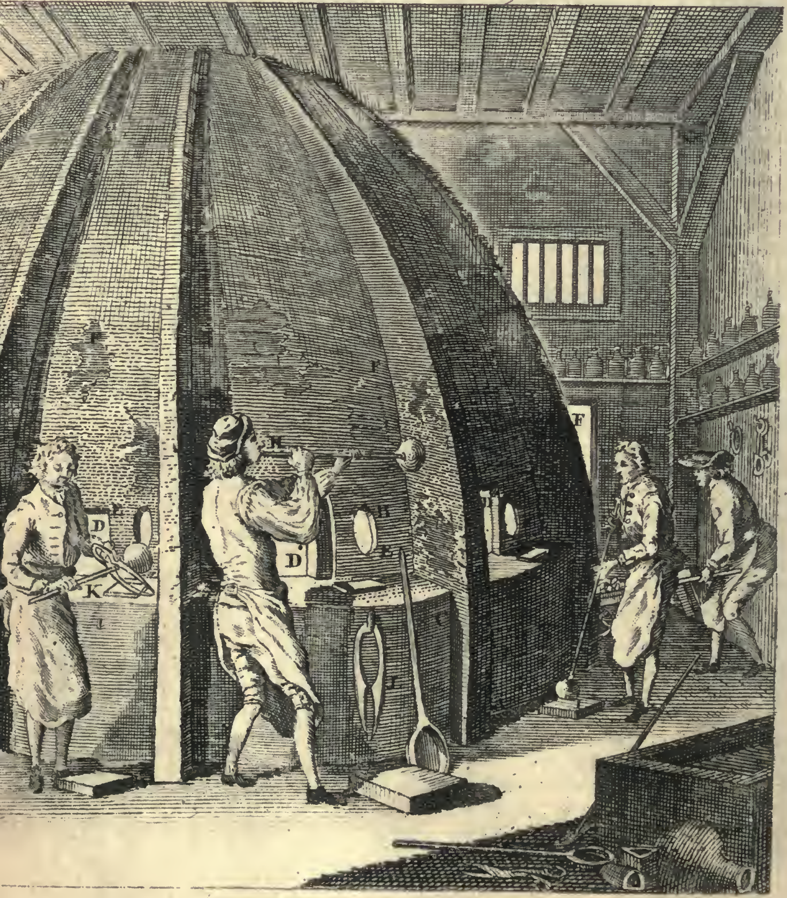


Fig. 3. GLASS MAKERS at Work.



J. Jefferys sculp

Neither acid juices nor any other matter extract either colour, taſte, or any other quality from it. 16. Admits of poliſhing. 17. Neither loſes weight nor ſubſtance by the longeſt and moſt frequent uſe. 18. Gives fuſion to other metals, and ſoftens them. 19. The moſt pliable thing in the world, and that which beſt retains the faſhion given it. 20. Not capable of being calcined. 21. An open glaſs being filled with water in the ſummer-time, will gather drops of water on the outſide, juſt ſo far as the water on the inſide reaches; and a perſon's breath blown on it will manifeſtly moiſten it. 22. Little glaſs balls filled with water, mercury, and other liquor, and thrown into the fire; as alſo drops of green glaſs being broken, will fly aſunder with a great noiſe. 23. Neither wine, beer, nor any other liquor, will make it muſty, or change its colour, or ruſt it. 24. It may be cemented, as ſtones and metals. 25. A drinking-glaſs, partly filled with water, and rubbed on the brim with a wet finger, yields muſical notes, higher or lower as the glaſs is more or leſs full, and will make the liquor friſk and leap.

Materials for making of GLASS. The materials whereof glaſs is made, we have already mentioned to be ſalt and ſand, or ſtones. The ſalt here uſed, is procured from a ſort of aſhes, brought from the Levant, called polverine, or rochetta; which aſhes are thoſe of a ſort of water-plant, called kali, cut down in ſummer, dried in the ſun, and burnt in heaps, either on the ground, or on iron-grates; the aſhes falling into a pit, grow into a hard maſs, or ſtone, fit for uſe. See KALI and POLVERINE.

To extract the ſalt, theſe aſhes, or polverine, are powdered and ſifted, then put into boiling water, and there kept till one third of the water be conſumed; the whole being ſtirred up, from time to time, that the aſhes may incorporate with the fluid, and all its ſalts be extracted: then the veſſel is filled up with new water, and boiled over again, till one half be conſumed; what remains is a ſort of lee, ſtrongly impregnated with ſalt. This lee, boiled over again in freſh coppers, thickens in about twenty-four hours, and ſhoots its ſalt; which is to be ladled out, as it ſhoots, into earthen pans, and thence into wooden fats to drain and dry. This done, it is groſsly pounded, and thus put in a ſort of oven, called calcar, to dry. It may be added, that there are other plants, beſides kali, which yield a ſalt fit for glaſs: ſuch are the alga or ſea-weed, the common way-thiſtle, bramble, hops, wormwood, woad, tobacco, fern, and the whole leguminous tribe, as peaſe, beans, &c. See the articles ASHES, SALT, EXTRACTION, ALGA, &c.

The ſand or ſtone, called by the artiſts Tarſo, is the ſecond ingredient in glaſs, and that which gives it the body and firmneſs. Theſe ſtones, Agricola obſerves, muſt be ſuch as will fuſe; and of theſe ſuch as are white and tranſparent are beſt; ſo that cryſtal challenges the precedency of all others. See the articles CRYSTAL and TARSO.

At Venice they chiefly uſe a ſort of pebble, found in the river Teſino, reſembling white marble, and called cuogolo. Indeed Ant. Neri aſſures us, that all ſtones which will ſtrike fire with ſteel, are fit to vitrify; but Dr. Merret ſhews, that there are ſome exceptions from this rule. Flints are admirable; and when calcined, powdered, and ſearced, make a pure white cryſtalline metal: but the expence of preparing them makes the maſters of our glaſs-houſes ſparing of their uſe. Where proper ſtones cannot be ſo conveniently had, ſand is uſed; which ſhould be white, and ſmall, and well waſhed, before it be applied: ſuch is uſually found in the mouths and ſides of rivers. Our glaſs-houſes are furniſhed with a fine ſand for cryſtal, from Maidſtone, the ſame with that uſed for ſand-boxes, and in ſcouring; and with a coarſer for green glaſs from Woolwich. For cryſtal glaſs, to 200 ℔ of tarſo, pounded fine, they put 130 ℔ of ſalt of polverine; mix them together, and put them into the calcar, a ſort of reverberatory furnace, being firſt well heated. Here they remain baking, frying, and calcining, for five hours, during which the workman keeps mixing them with a rake, to make them incorporate: when taken out, the mixture is called frit, or bollito. See FRIT and BOLLITO.

It may be further obſerved, that glaſs might be made by immediately melting the materials without thus calcining, and making them frit; but the operation would be much more tedious.

A glaſs much harder than any prepared in the common way may be made by means of borax, in the following manner. Take four ounces of borax, and an ounce of fine white ſand, reduced

ced to powder, and melt them together in a large cloſe crucible ſet in a wind furnace, keeping a ſtrong fire for half an hour: then take out the crucible, and when cold, break it; and there will be found at the bottom a hard, pure glaſs, capable of cutting common glaſs almoſt like a diamond. This experiment duly varied, ſays Dr. Shaw, may lead to ſome conſiderable improvements in the art of glaſs, enamels, and artificial gems. It ſhews us an expeditious method of making glaſs without the uſe of fixed ſalts, which has generally been thought an eſſential ingredient in glaſs, and which is the ingredient that gives common glaſs its ſoftneſs; and it is not yet known, whether calcined cryſtal, or other ſubſtances, being added to this ſalt, inſtead of ſand, it might not make a glaſs approaching to the nature of a diamond. See the article GEM.

Kinds of GLASS. Of theſe materials we have many ſorts of glaſs made, which may principally be diſtinguiſhed according to their beauty; as the cryſtal flint glaſs, the cryſtal white glaſs, the green glaſs, and the bottle glaſs. Again theſe ſorts are diſtinguiſhed by their ſeveral uſes; as plate or coach-glaſſes, looking-glaſſes, optic-glaſſes, *&c.* which are made of the firſt ſort. The ſecond ſort includes crown-glaſs, toys, phials, drinking glaſſes, *&c.* The third ſort is well known by its colour, and the ſecond by its form.

Balas coloured GLASS is made thus: put into a pot cryſtal frit, thrice waſhed in water; tinge this with mangane
ſe prepared into a clear purple: to this add alumen cativum ſifted fine in ſmall quantities, and at ſeveral times; this will make the glaſs grow yellowiſh, and a little reddiſh, but not blackiſh, and always diſſipates the mangane
ſe. The laſt time you add manganeſe, give no more of the alumen cativum, unleſs the colour be too full. Thus will the glaſs be exactly of the colour of the balas-ruby.

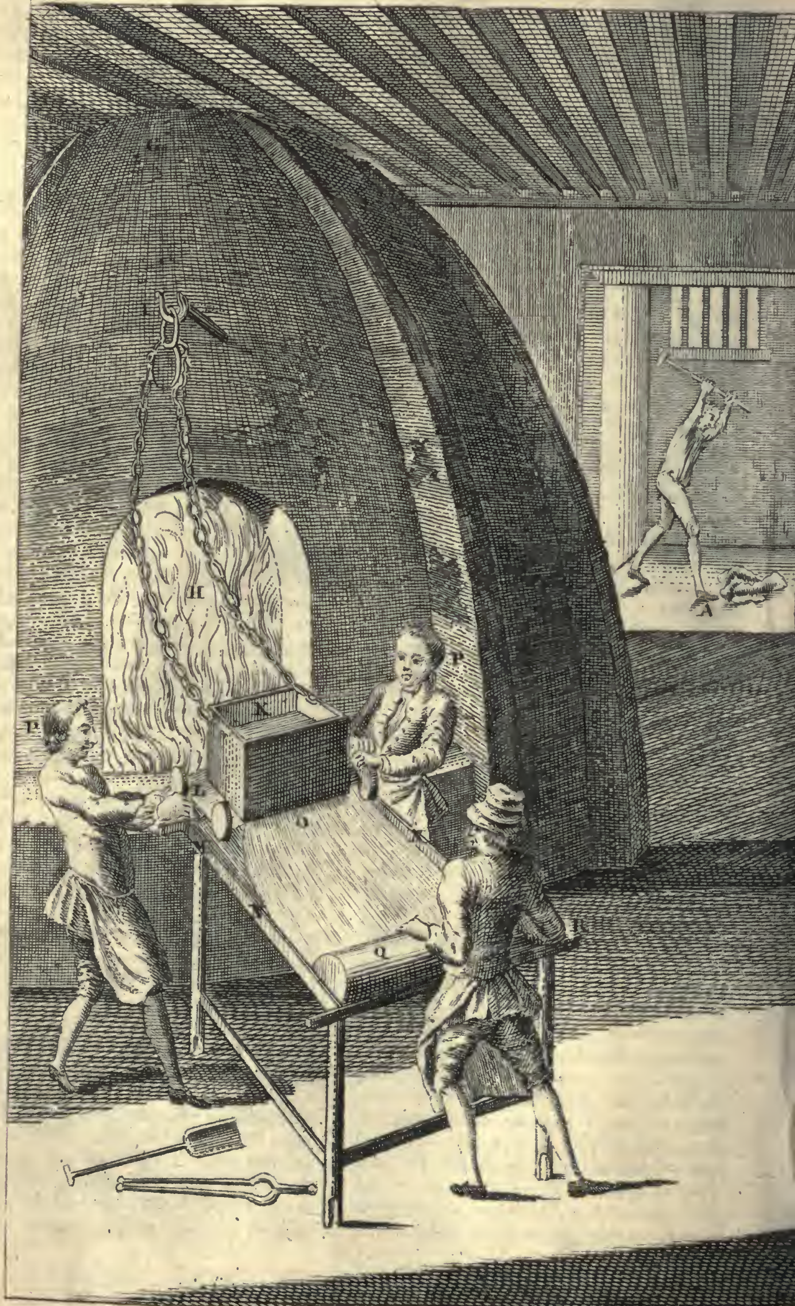
Red GLASS. A blood-red glaſs may be made in the following manner: put ſix pounds of glaſs of lead, and ten pounds of common glaſs into a pot glazed with white glaſs: when the whole is boiled and refined, add, by ſmall quantities, and at ſmall diſtances of time, copper calcined to a redneſs, as much as, on repeated proofs, is found ſufficient: then add tartar in powder by ſmall quantities at a time, till the glaſs is become as red as blood; and continue adding one or other of the ingredients till the colour is quite perfect.

Yellow GLASS. It is a neceſſary remark in glaſs making, that the cryſtal-glaſs made with ſalt that has an admixture of tartar will never receive the true gold yellow, though it will all other colours: for yellow glaſs, therefore, a ſalt muſt be prepared from polverine, or pot-aſhes alone to make the glaſs.

Furnaces for the making GLASS. In this manufacture, there are three ſorts of furnaces, one called calcar, is for the frit, the ſecond is for working the glaſs, the third ſerves to anneal the glaſs, and is called the leer. See FURNACE.

The calcar A, (plate CXIII. fig. 3.) reſembles an oven ten feet long, ſeven broad, and two deep: the fuel, which in England is ſea coal, is put into a trench on one ſide of the furnace; and the flame reverberating from the roof upon the frit, calcines it. The glaſs-furnace, or working furnace B, is round, of three yards diameter, and two high; or thus proportioned. It is divided into three parts, each of which is vaulted. The lower part C is properly called the crown, and is made in that form. Its uſe is to keep a briſk fire of coal and wood, which is never put out. The mouth of it is called the bocca. There are ſeveral holes in the arch of this crown, through which the flame paſſes into the ſecond vault, or partition, and reverberates into the pots filled with the ingredients above-mentioned. Round the inſides are eight or more pots placed, and piling pots on them. The number of pots is always double that of the boccos D, or mouths, or of the number of workmen, that each may have one pot refined to work out of, and another for metal to refine in, while he works out of the other. Through the working holes the metal is taken out of the pots, and the pots are put into the furnace, and theſe holes are ſtopped with moveable covers made of lute and brick, to ſcreen the workmens eyes from the ſcorching flames. On each ſide of the bocca, or mouth, is a bocarella, or little hole, out of which coloured glaſs, or finer metal, is taken from the piling pot. Above this oven, there is the third oven or leer, about five or ſix yards long, where the veſſels, or glaſs, is annealled, or cooled: this part conſiſts of a tower, beſides the leer

Caſting and Running of PLATE GLASS.



J. Jefferys sculp

F, into which the flame aſcends from the furnace. The tower has two mouths, through which the glaſſes are put in with a fork, and ſet on the floor or bottom: but they are drawn out on iron pans, called fraches, through the leer, to cool by degrees; ſo that they are quite cold by the time they reach the mouth of the leer, which enters the ſaroſel, or room where the glaſſes are to be ſtowed.

But the green glaſs furnace is ſquare; and at each angle it has an arch for annealing, or cooling the glaſſes. The metal is wrought on two oppoſite ſides, and on the other two they have their colours, into which are made linnet holes, for the fire to come from the furnace to bake the frit, and to diſcharge the ſmoke. Fires are made in the arches to anneal the work, ſo that the whole proceſs is done in one furnace.

Theſe furnaces muſt not be of brick, but of hard ſandy ſtones. In France, they build the outſide of brick, and the inner part to bear the fire is made of a ſort of fuller's earth, or tobacco-pipe clay, of which earth they alſo make their melting-pots.

Mr. Blancourt obſerves, that the worſt and rougheſt work in this art, is the changing the pots, when they are worn out, or cracked. In this caſe the great working hole muſt be uncovered; the faulty pot muſt be taken out with iron hooks and forks, and a new one muſt be ſpeedily put in its place, thro' the flames, by the hands only. For this work, the man guards himſelf with a garment made of ſkins, in the ſhape of a pantaloon, that covers him all but his eyes, and is made as wet as poſſible: the eyes are defended with a proper ſort of glaſs.

Inſtruments for making of GLASS. The inſtruments made uſe of in this work, may be reduced to thoſe that follow. A blowing pipe, made of iron, about two feet and a half long, with a wooden handle. An iron rod to take up the glaſs, after it is blown, and to cut off the former. Sciſſars to cut the glaſs when it comes off from the firſt hollow iron. Shears to cut and ſhape great glaſſes, *&c.* an iron ladle, with the end of the handle caſed with wood, to take the metal out of the refining pot to put it into the workmens pots. A ſmall iron laddle, caſed in the ſame manner, to ſkim the alkalic ſalt, that ſwims at top. Shovels, one like a peel to take up the great glaſſes; another, like a fire-ſhovel, to feed the furnace with coals. A hooked iron fork, to ſtir the matter in the pots. An iron rake for the ſame purpoſe, and to ſtir the frit. An iron fork, to change or pull the pots out of the furnace, *&c.*

Working or blowing round GLASS. The tools thus provided, the workman dips his blowing pipe into the melting-pot, and by turning it about, the metal ſticks to the iron more firmly than turpentine. This he repeats four times, at each time rolling the end of his inſtrument, with the hot metal thereon, on a piece of iron G, over which is a veſſel of water which helps to cool, and ſo to conſolidate, and to diſpoſe that matter to bind more firmly with what is to be taken next out of the melting-pot. But after he has dipt a fourth time, and the workman perceives there is metal enough on the pipe, he claps his mouth immediately to the other end of it H, and blows gently through the iron tube, till the metal lengthens like a bladder about a foot. Then he rolls it on a marble ſtone I, a little while, to poliſh it, and blows a ſecond time, by which he brings it to the ſhape of a globe of about eighteen or twenty inches diameter. Every time he blows into the pipe, he removes it quickly to his cheek, otherwiſe he would be in danger, by often blowing, of drawing the flame into his mouth; and this globe may be flattened by returning it to the fire, and brought into any form by ſtamp-irons, which are always ready. When the glaſs is thus blown, it is cut off at the collet, or neck, which is the narrow part that ſtuck to the iron. The method of performing this, is as follows: the pipe is reſted on an iron bar, cloſe by the collet: then a drop of cold water being laid on the collet, it will crack about a quarter of an inch, which with a ſlight blow, or cut of the ſhears K, will immediately ſeparate the collet.

After this is done, the operator dips the iron rod into the melting-pot, by which he extracts as much metal as ſerves to attract the glaſs he has made, to which he now fixes this rod at the bottom of his work, oppoſite to the opening made by the breaking of the collet. In this poſition, the glaſs is carried to the great bocca, or mouth of the oven, to be heated and ſcalded, by which means it is again put into ſuch a ſoft ſtate, that by the help of an iron inſtrument, it can be pierced, opened, and widened without breaking. But the veſſel is not finiſhed, till it is returned to the great bocca; where it being again heated thoroughly, and turned quickly about with a circular motion, it will open to any ſize, by the means of the heat and motion. And by this means we come to learn the cauſe why the edge of all bowls and glaſſes, &c. are thicker than the other parts of the ſame glaſſes, becauſe in the turning it about in the heat, the edge thickens; and the glaſs being as it were doubled in that part, the circumference appears like a ſelvage.

If there remains any ſuperfluities, they are cut off with the ſhears L; for till the glaſs is cool, it remains in a ſoft, flexible ſtate. It is therefore taken from the bocca, and carried to an earthen bench, covered with brands, which are coals extinguiſhed, keeping it turning; becauſe that motion prevents any ſettling, and preſerves an evenneſs in the face of the glaſs, where, as it cools, it comes to its conſiſtency; being firſt cleared from the iron rod by a ſlight ſtroke by the hand of the workman.

If the veſſel conceived in the workman's mind, and whoſe body is already made, requires a foot, or a handle, or any other member or decoration, he makes them ſeparate; and now aſſays to join them with the help of hot metal, which he takes out of the pots with his iron rod: but the glaſs is not brought to its true hardneſs, till it has paſſed the leer, or annealing oven, deſcribed before.

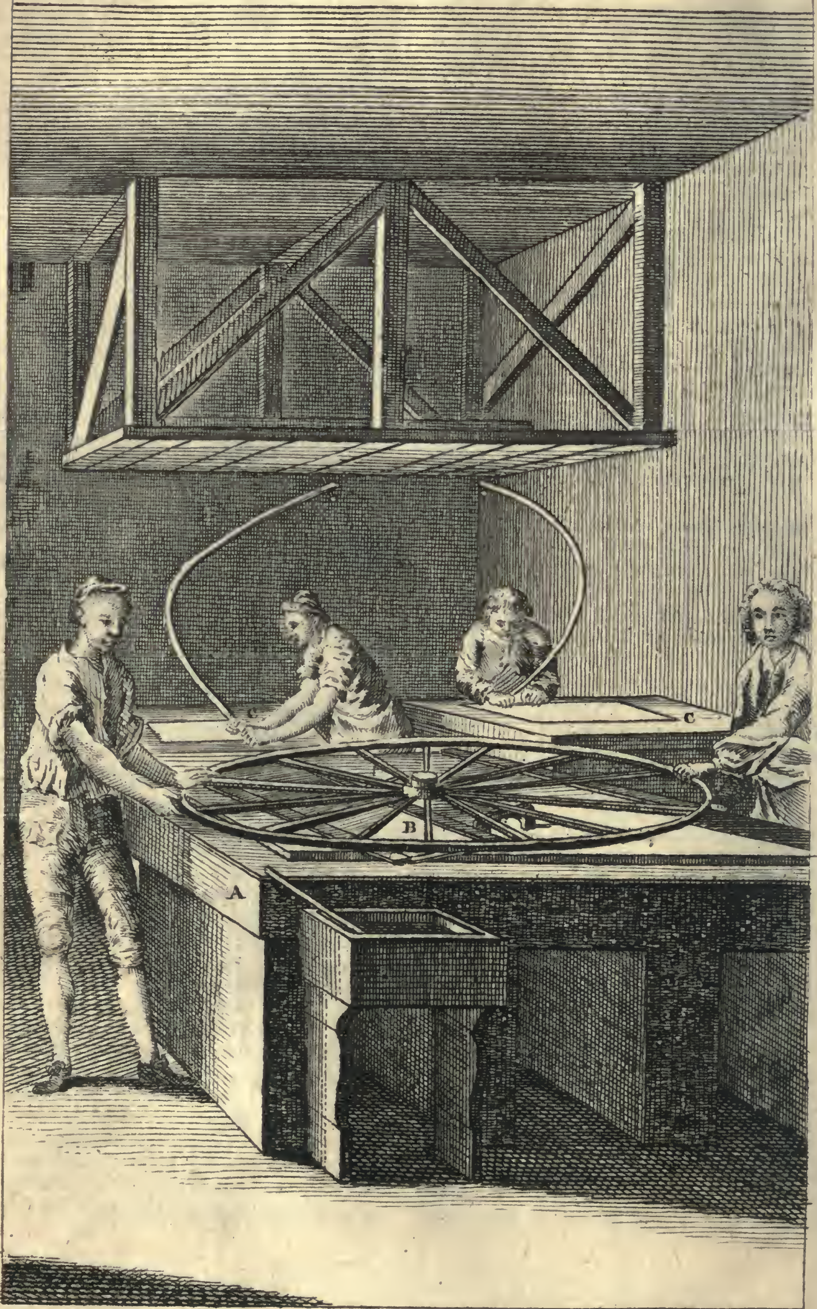
Working, or blowing, of window or table GLASS. The method of working round glaſs, or veſſels of any ſort, is in every particular applicable to the working of window or table-glaſs, till the blowing iron has been dipt the fourth time. But then inſtead of rounding it, the workman blows, and ſo manages the metal upon the iron-plate, that it extends two or three feet in the form of a cylinder. This cylinder is put again to the fire, and blown a ſecond time, and is thus repeated till it is extended to the dimenſions required, the ſide to which the pipe is fixed diminiſhing gradually till it ends in a pyramidical form; ſo that to bring both ends nearly to the ſame diameter, while the glaſs is thus flexible, he adds a little hot metal to the end oppoſite the pipe, and draws it out with a pair of iron pincers, and immediately cuts off the ſame end with the help of a little cold water, as before.

The cylinder being now open at one end is carried back to the bocca, and there, by the help of cold water, it is cut about eight or ten inches from the iron pipe, or rod; and the whole length at another place, by which alſo it is cut off from the iron rod. Then it is heated gradually on an earthen table, by which it opens in length, while the workman, with an iron tool, alternately lowers and raiſes the two halves of the cylinder, which at laſt will open like a ſheet of paper, and fall into the ſame flat form in which it ſerves for uſe; in which it is preſerved by heating it over again, cooling it on a table of copper, and hardening it twenty-four hours in the annealing furnace, to which it is carried upon forks. In this furnace, an hundred tables of glaſs may lie at a time, without injury to each other, by ſeparating them into tens, with an iron ſhiver between, which diminiſhes the weight by dividing it, and keeps the tables flat and even.

This was the method formerly made uſe of for blowing plate-glaſs, looking-glaſſes, &c. but the workmen, by this method, could never exceed fifty inches in length, and a proportional breadth, becauſe what were larger were always found to warp, which prevented them from reflecting the objects regularly, and wanted ſubſtance to bear the neceſſary grinding. Theſe imperfections have been remedied by an invention of the Sieur Abraham Thevart, in France, about the year 1688, of caſting or running large plates of glaſs in the following manner.

*Caſting, or running of large looking-*GLASS *plates.* The furnace G, (plate CXIV.) is of a very large dimenſion, environed with ſeveral ovens, or annealing furnaces, called carquaſſes, beſides others for making of frit, and calcining old pieces of glaſs. This furnace, before it is fit to run glaſs, coſts 3500 l. It ſeldom laſts above three years, and even in that time it muſt be refitted every ſix months. It takes ſix months to rebuild it; and three months to refit it. The melting-pots are as big as large hogſheads, and contain about 2000 weight of metal. If one of them burſts in the furnace, the loſs of the matter and time amounts to 250 l. The heat of this furnace is ſo intenſe, that a bar of iron laid at the mouth

Grinding and Pollishing of PLATE GLASS



T. Jefferys sculp

mouth thereof becomes red hot in leſs than half a minute. The materials in theſe pots are the ſame as deſcribed before; and A is the man breaking the frit for that purpoſe. When the furnace is red hot, theſe materials are put in at three different times, becauſe that helps the fuſion; and in twenty-four hours they are vitrified, refined, ſettled, and fit for caſting. H is the bocca, or mouth of the furnace, K is the ciſtern that conveys the liquid glaſs it receives out of the melting-pots in the furnace to the caſting table. Theſe ciſterns are filled in the furnace, and remain therein ſix hours after they are filled; and then are hooked out by the means of a large iron chain, guided by a pully marked I, and placed upon a carriage with four wheels marked L, by two men P, P. This carriage has no middle piece; ſo that when it has brought the ciſtern to the caſting table M. they ſlip off the bottom of the ciſtern, and out ruſhes a torrent of flaming matter O, upon the table: this matter is confined to certain dimenſions by the iron rulers N, N, N, which are moveable, retain the fluid matter, and determine the width of the glaſs; while a man R, with the roller Q reſting on the edge of the iron rulers, reduceth it as it cools to an equal thickneſs, which is done in the ſpace of a minute. This table is ſupported on a wooden frame, with truſtles for the convenience of moving to the annealing furnace; into which, ſtrewed with ſand the new plate is ſhoved, where it will harden in about ten days. After this the glaſs needs only be ground, poliſhed, and foliated for uſe.

Grinding and poliſhing of plate GLASS. Glaſs is made tranſparent by fire, but it receives its luſtre by the ſkill and labour of the grinder and poliſher, the former of whom takes its rough out of the hands of the maker.

In order to grind plate glaſs, they lay it horizontally upon a flat ſtone table, (pl. CXV.) made of a very fine grained free-ſtone; and for its greater ſecurity they plaſter it down with lime, or ſtucco: for otherwiſe the force of the workmen, or the motion of the wheel, with which they grind it, would move it about.

This ſtone-table is ſupported by a ſtrong frame, A, made of wood, with a ledge quite round its edges, riſing about two inches higher than the glaſs. Upon this glaſs to be ground, is laid another rough glaſs not above half ſo big, and ſo looſe as to ſlide upon it; but cemented to a wooden plank, to guard it from the injury it muſt otherwiſe receive from the ſcraping of the wheel, to which this plank is faſtened; and from the weights laid upon it, to promote the grinding, or friture, of the glaſſes. The whole is covered with a wheel, B, made of hard light wood, about ſix inches in diameter; by pulling of which backwards and forwards alternately, and ſometimes turning it round, the workmen who always ſtand oppoſite to each other, produce a conſtant attrition between the two glaſſes, and bring them to what degree of ſmoothneſs they pleaſe, by firſt pouring in water and coarſe ſand: after that a finer ſort of ſand as the work advanceth, till at laſt they muſt pour in the powder of ſmalt. As the upper or incumbent glaſs poliſhes, and grows ſmoother, it muſt be taken away, and another from time to time put in its place.

This engine is called a mill by the artiſts, and is uſed only in the largeſt ſize glaſſes; for in the grinding of the leſſer glaſſes, they are content to work without a wheel, and to have only four wooden handles faſtened to the four corners of the ſtone which loads the upper plank, by which they work it about.

When the grinder has done his part, who finds it very difficult to bring the glaſs to an exact plainneſs, it is turned over to the care of the poliſher, who with the fine powder of tripoli-ſtone, or emery, brings it to a perfect evenneſs and luſtre. The inſtrument made uſe of in this branch, is a board, *c*, *c*, furniſhed with a felt, and a ſmall roller, which the workman moves by means of a double handle at both ends. The artiſt in working this roller, is aſſiſted with a wooden hoop, or ſpring, to the end of which it is fixed: for the ſpring, by conſtantly bringing the roller back to the ſame points, facilitates the action of the workman's arm.

Grinding and poliſhing of optic GLASSES. See GRINDING and POLISHING.

Foliating of GLASS. See FOLIATING.

Axungia of GLASS. See AXUNGIA.

Painting in GLASS. The antient manner of painting in glaſs was very ſimple and conſequently very eaſy; it conſiſted in the mere arrangement of pieces of glaſs of different colours in ſome ſort of ſymmetry, and conſtituted what is now called moſaic work. See the article MOSAIC.

In proceſs of time they came to attempt

more regular deſigns, and alſo to repreſent figures heightened with all their ſhades: yet they proceeded no farther than the contours of the figures in black with water colours, and hatching the draperies after the ſame manner on glaſſes of the colour of the object they deſigned to paint. For the carnation they uſed glaſs of a bright red colour; and upon this they drew the principal lineaments of the face, &c. with black.

But in time, the taſte for this ſort of painting improving conſiderably, and the art being found applicable to the adorning of churches, baſilics, &c. they found out means of incorporating the colours in the glaſs itſelf, by heating them in the fire to a proper degree; having firſt laid on the colours. The colours uſed in painting or ſtaining of glaſs are very different from thoſe uſed in painting either in water or oil colours. See the article COLOUR.

For black, Take ſcales of iron, one ounce; ſcales of copper, one ounce; jet, half an ounce; reduce them to powder, and mix them. For blue, Take powder of blue, one pound; ſal nitre, half a pound; mix them and grind them well together. For carnation, Take red chalk, eight ounces; iron ſcales and litharge of ſilver, of each two ounces; gum arabic, half an ounce; diſſolve in water; grind all together for half an hour as ſtiff as you can; then put it in a glaſs and ſtir it well, and let it ſtand to ſettle fourteen days. For green, Take red lead, one pound; ſcales of copper, one pound; and flint, five pounds; divide them into three parts; and add to them as much ſal nitre; put them into a crucible, and melt them with a ſtrong fire; and when it is cold, powder it, and grind it on a porphyry. For gold colour, Take ſilver, an ounce; antimony, half an ounce; melt them in a crucible; then pound the maſs to powder; and grind it on a copper plate; add to it yellow oker, or brick-duſt calcined again, fifteen ounces; and grind them well together with water. For purple, Take minium, one pound; brown ſtone, one pound; white flint, five pounds; divide them into three parts, and add to them as much ſal nitre as one of theſe parts; calcine, melt, and grind it as you did the green. For red, Take jet, four ounces; litharge of ſilver, two ounces; red chalk, one ounce; powder them fine; and mix them. For white, Take jet two parts; white flint, ground on a glaſs very fine, one part; mix them. For yellow, Take ſpaniſh brown, ten parts; leaf ſilver, one part; antimony, half a part; put all into a crucible, and calcine them well.

In the windows of antient churches, &c. there are to be ſeen the moſt beautiful and vivid colours imaginable, which far exceed any of thoſe uſed by the moderns, not ſo much becauſe the ſecret of making thoſe colours is intirely loſt, as that the moderns will not go to the charge of them, nor be at the neceſſary pains, by reaſon that this ſort of painting is not now ſo much in eſteem as formerly. Thoſe beautiful works which were made in the glaſs houſes were of two kinds.

In ſome, the colour was diffuſed through the whole ſubſtance of the glaſs. In others, which were the more common, the colour was only on one ſide, ſcarce penetrating within the ſubſtance above one third of a line; though this was more or leſs according to the nature of the colour; the yellow being always found to enter the deepeſt. Theſe laſt, though not ſo ſtrong and beautiful as the former, were of more advantage to the workmen, by reaſon that on the ſame glaſs, tho' already coloured, they could ſhew other kind of colours where there was occaſion to embroider draperies, enrich them with foliages, or repreſent other ornaments of gold, ſilver, &c.

In order to this, they made uſe of emery, grinding or wearing down the ſurface of the glaſs, till ſuch time as they were got through the colour to the clear glaſs. This done, they applied the proper colours on the other ſide of the glaſs. By this means, the new colours were hindered from running and mixing with the former, when they expoſed the glaſſes to the fire, as will appear hereafter.

When indeed the ornaments were to appear white, the glaſs was only bared of its colour with emery, without tinging the place with any colour at all; and this was the manner by which they wrought their lights, and heightenings, on all kinds of colour.

The firſt thing to be done, in order to paint, or ſtain glaſs, in the modern way, is to deſign, and even colour the whole ſubject on paper. Then they chooſe ſuch pieces of glaſs as are clear, even, and ſmooth, and proper to receive the ſeveral parts, and proceed to diſtribute the deſign itſelf, or papers it is drawn on, into pieces ſuitable to thoſe of the glaſs; always taking care that the glaſſes may join in the contours of the figures, and the folds of the draperies; that the carnations, and other finer parts, may not be impaired by the lead with which the pieces are to be joined together. The diſtribution being made, they mark all the glaſſes as well as papers, that they may be known again: which done, applying every part of the deſign upon the glaſs intended for it, they copy, or transfer, the deſign upon this glaſs with the black colour diluted in gum water, by tracing and following all the lines and ſtrokes as they appear through the glaſs with the point of a pencil.

When theſe ſtrokes are well dried, which will happen in about two days, the work being only in black and white, they give a ſlight waſh over with urine, gum arabic, and a little black; and repeat it ſeveral times, according as the ſhades are deſired to be heightened, with this precaution, never to apply a new waſh till the former is ſufficiently dried.

This done, the lights and riſings are given by rubbing off the colour in the reſpective places with a wooden point, or the handle of the pencil.

As to the other colours above-mentioned, they are uſed with gum-water, much as in painting in miniature; taking care to apply them lightly for fear of effacing the out-lines of the deſign; or even, for the greater ſecurity, to apply them on the other ſide; eſpecially yellow, which is very pernicious to the other colours, by blending therewith. And here too, as in pieces of black and white, particular regard muſt always be had not to lay colour on colour, or lay on a new lay, till ſuch time as the former are well dried.

It may be added, that the yellow is the only colour that penetrates through the glaſs, and incorporates therewith by the fire; the reſt, and particularly the blue, which is very difficult to uſe, remaining on the ſurface, or at leaſt entering very little. When the painting of all the pieces is finiſhed, they are carried to the furnace, or oven, to anneal, or bake the colours.

The furnace here uſed is ſmall, built of brick, from eighteen to thirty inches ſquare; at ſix inches from the bottom is an aperture to put in the fuel, and maintain the fire. Over this aperture is a grate, made of three ſquare bars of iron, which traverſe the furnace, and divide it into two parts. Two inches above this partition, is another little aperture, through which they take out pieces to examine how the coction goes forward. On the grate is placed a ſquare earthen pan, ſix or ſeven inches deep; and five or ſix inches leſs every way than the perimeter of the furnace. On the one ſide hereof is a little aperture, through which to make trials, placed directly oppoſite to that of the furnaces deſtined for the ſame end. In this pan are the pieces of glaſs to be placed, in the following manner. Firſt, the bottom of the pan is covered with three ſtrata, or layers, of quick lime pulverized; thoſe ſtrata being ſeparated by two others of old broken glaſs, the deſign whereof is to ſecure the painted glaſs from the too intenſe heat of the fire. This done, the glaſſes are laid horizontally on the laſt or uppermoſt layer of lime.

The firſt row of glaſs they cover over with a layer of the ſame powder, an inch deep; and over this, they lay another range of glaſſes, and thus alternately till the pan is quite full; taking care that the whole heap always end with a layer of the lime powder.

The pan being thus prepared, they cover up the furnace with tiles, on a ſquare table of earthen ware, cloſely luted all round; only leaving five little apertures, one at each corner, and another in the middle, to ſerve as chimnies. Things thus diſpoſed, there remains nothing but to give the fire to the work. The fire for the firſt two hours muſt be very moderate, and muſt be increaſed in proportion as the coction advances, for the ſpace of ten or twelve hours; in which time it is uſually compleated. At laſt the fire, which at firſt was charcoal, is to be of dry wood, ſo that the flame covers the whole pan, and even iſſues out at the chimnies. During the laſt hours, they make eſſays, from time to time, by taking out pieces laid for the purpoſe through the little aperture of the furnace, and pan, to ſee whether the yellow be perfect, and the other colours in good order. When the annealing is thought ſufficient, they proceed with great haſte to extinguiſh the fire, which otherwiſe would ſoon burn the colours, and break the glaſſes.

Glass *of lead*, a glaſs made with the addition of a large quantity of lead; of great uſe in the art of making counterfeit gems. See the article Gem.

The method of making it is this. Put a large quantity of lead into a potter's kiln; and keep it in a ſtate of fuſion, with a moderate fire, till it is calcined to a very grey, looſe powder; then ſpread it on the kiln, and give it a greater heat, continually ſtirring it, to keep it from gathering into lumps: continue this ſeveral hours, till the powder become of a fair yellow; then take it out, and ſift it fine: this is called calcined lead. Take of this calcined lead fifteen pounds, and cryſtalline or other frit, twelve pounds; mix theſe as well as poſſible together; put them into a pot, and ſet them in the furnace for ten hours; then caſt the whole, which will now be perfectly melted, into water; ſeparate the looſe lead from it; and return the metal into the pot; and after ſtanding in fuſion twelve hours more, it will be fit to work. This glaſs is capable of all the colours of the gems in great perfection.

Glass *porcelain*, the name given by many to a modern invention of imitating the china-ware with glaſs. See **Porcelain**. The method of making it, as given by Mr. Reaumur, who was the firſt that carried the attempt to any degree of perfection, is as follows.

The glaſs veſſels to be converted into porcelain, are to be put into large veſſels, ſuch as the common fine earthen diſhes are baked in; or, into ſufficiently large crucibles: the veſſels are to be filled with a mixture of fine white ſand, and of fine gypſum; or plaſter-ſtone, burnt into what is called plaſter of paris; and all the interſtices are to be filled up with the ſame powder, ſo that the glaſs veſſel may no where touch either one another, or the ſides of the veſſels they are baked in.

The veſſel is to be then covered down, and luted, and the fire does the reſt of the work; for this is only to be put into a common potter's furnace, and when it has ſtood there the uſual time of baking the other veſſels, it is to be taken out, and the whole contents will be found no longer glaſs, but converted into a white opake ſubſtance, which is a very elegant porcelain, and has almoſt the properties of that of china.

Glass *of chalcedony*, a mixture of ſeveral ingredients with the common mixture of glaſs, which will make it repreſent the ſemi-opake gems, the jaſpers, agates, chalcedonies, &c. See **Gem**.

Glass *of antimony* may be deprived of its emetic quality by digeſting it with pure ſpirit of vinegar till the menſtruum be highly tinged. See the article **Antimony**.

Mr. Boyle ſays, that if you abſtract this liquor, and digeſt good rectified ſpirit of wine on the remaining powder, an excellent tincture againſt ſeveral diſeaſes may be obtained. See **Tincture**.

Duties on **Glass**. Balm-glaſſes, on importation, pay per groſs, 2 s. $5\frac{98\frac{1}{8}}{100}$d; and draw back on exportation, 2 s. $3\frac{84\frac{3}{8}}{100}$d. Burning-glaſſes, on importation, pay, per dozen, $11\frac{99\frac{1}{4}}{100}$d. and draw back on exportation, $11\frac{13\frac{3}{4}}{100}$d. Perſpective-glaſſes, the piece not exceeding three feet in length, pay 8 s. $1\frac{5}{100}$d. on importation; and draw back 7 s. $4\frac{50}{100}$d. on exportation. Perſpective-glaſſes exceeding three feet in length, pay 16 s. $2\frac{10}{100}$d. on importation; and draw back 14 s. 9 d. on exportation. Small perſpective-glaſſes the dozen, pay on importation 8s. $1\frac{5}{100}$d. and draw back on exportation, 7s. $4\frac{50}{100}$d. Vials the hundred, pay on importation, 4 s. $11\frac{96\frac{1}{2}}{100}$d. and draw back on exportation, 4 s. $7\frac{68\frac{3}{4}}{100}$d. Water glaſſes the dozen pay on importation, 3 s. $11\frac{97}{100}$d. and draw back on exportation, 3 s. $8\frac{55}{100}$d. Broken glaſs the 112 ℔. pays on importation, 1 s. $\frac{13\frac{1}{8}}{100}$d. and draws back on exportation, $11\frac{6\frac{1}{4}}{100}$d. Coarſe drinking-glaſſes, the dozen pay on importation $11\frac{99\frac{1}{4}}{100}$d. and draw back on exportation, $11\frac{13\frac{3}{4}}{100}$d. Flanders drinking glaſſes per hundred, pay on importation, 8 s. $3\frac{93\frac{3}{4}}{100}$d. and draw back on exportation, 7s. $8\frac{81\frac{1}{4}}{100}$d. French drinking-glaſſes per hundred, pay on importation, 10 s. $1\frac{83\frac{3}{4}}{100}$d. and draw back on exportation, 6 s. $\frac{56\frac{1}{4}}{100}$d. Venice drinking-glaſſes the dozen pay on importation, 5 s. $11\frac{95\frac{1}{2}}{100}$d. and draw back on exportation, 5 s. $6\frac{82\frac{1}{2}}{100}$d. Flanders coarſe hour-glaſſes, the groſs pay on importation, 19 s. $11\frac{85}{100}$d. and draw back on exportation, 18 s. $6\frac{75}{100}$d. Flanders fine hour-glaſſes pay per dozen, on importation, 6 s. $7\frac{95}{100}$d. and draw back on exportation, 6 s. $2\frac{25}{100}$d. Venice hour-glaſſes, the dozen, pay, on importation, 19 s. $11\frac{85}{100}$d. and draw back on exportation, 18 s. $6\frac{75}{100}$d. Looking-glaſſes of cryſtal, ſmall, n° 6. pay per dozen on importation, 9 s. $11\frac{92\frac{1}{2}}{100}$d. and draw back on exportation, 9 s. $3\frac{37\frac{1}{2}}{100}$d. Middle ſort, the dozen pay on importation, 19 s. $11\frac{85}{100}$d. and draw back on exportation, 18 s. $6\frac{5}{100}$d. Looking glaſſes of cryſtal, the dozen n° 11, 12. pay on importation, 14 l. 19 s. $9\frac{75}{100}$d. and draw back on exportation, 13 l. 18 s. $5\frac{25}{100}$d.

GLASTONBURY, a market-town of Somerſetſhire, five miles ſouth of Wells.

GLASTONBURY-THORN, in botany, a ſpecies of meſpilus, or medlar.

GLATZ, the capital of a county of the ſame name in Bohemia, 100 miles eaſt of Prague: eaſt long. 16° 8′, north lat. 50° 25′.

GLAUBER'S SALT, a cathartic or purging ſalt, thus made. Take of the cake that remains after the diſtillation of Glauber's ſpirit of ſea-ſalt; diſſolve it in hot water, and filtre the ſolution through paper. Then reduce the ſalt into cryſtals. It is given in doſes, from half an ounce to an ounce. See SALT.

Glauber's ſalt, called by ſome ſal mirabile, is nearly allied to Epſom ſalt. See EPSOM.

GLAUCION, in ornithology, a very elegant freſh water fowl, of the anas or duck-kind, nearly of the ſize of the common wild duck: its eyes are bright and very piercing in their aſpect, and the iris of a fine gold yellow. See ANAS.

GLAUCOMA, in medicine, the change of the cryſtalline humour of the eye into an azure-colour, proceeding from its dryneſs and condenſation, as ſome affirm; but Heiſter rather thinks, it ariſes from an opacity of the vitreous humour, which becomes of a whitiſh green colour: for in a ſuffuſion, an opake body is placed behind the pupil, or is next to the uveous part. Sennertus ſays, it may be known from a very remarkable whiteneſs appearing in the eye, and lying deep behind the pupil; which makes every thing appear as if ſeen through a ſmoak or cloud. It is ſaid to be incurable when inveterate; but that the medicines preſcribed for a gutta ſerena, are beſt alſo in this caſe. See the article GUTTA SERENA.

GLAUCUS, in ichthyology, the name of two diſtinct fiſhes, the one a ſpecies of ſcomber, with the ſecond ray of the hinder back-fin longeſt; and the other a ſpecies of ſqualus, with a triangular cavity in the hinder part of the back, but without any foramina beſide the eyes. This laſt is the blue ſhark.

GLAUX, in botany, a genus of the pentandria monogynia claſs of plants, the flower of which conſiſts of a ſingle, campanulated, erect, and permanent petal, divided into five roundiſh ſegments: the fruit is a large, globoſe, but acuminated and unilocular capſule, formed of five valves, and containing five roundiſh ſeeds.

GLAUX is alſo the name by which ſome call the aſtragalus, or milk-vetch. See the article ASTRAGALUS.

GLAZIER, an artificer who works in glaſs. See the article GLASS.

The principal part of a glazier's buſineſs conſiſts in fitting panes and plates of glaſs to the ſaſhes and window-frames of houſes, pictures, &c. and in cleaning the ſame.

GLAZING, the poliſhing or cruſting over earthen-ware, by running melted lead or litharge over it.

The common ware is glazed with a compoſition of 50 lb. clean ſand, 70 lb. lead-aſhes, 30 lb. wood-aſhes, and 12 lb. ſalt, all melted into a cake. With this mixture they glaze it over, and then ſet it in an earthen glazing plan; taking care that the veſſels do not touch one another. As ſeveral colours are uſed for this purpoſe, we ſhall give the following receipts, from Smith's Laboratory. 1. For a black, take lead-aſhes, 18 parts; iron filings, 3; copper-aſhes, 3; and zaffer, 2: this, when melted, will make a brown black; and if you would have it blacker, put ſome more zaffer to it. 2. For blue, take lead-aſhes, 1 lb. clear ſand or pebble, 2 lb. ſalt, 2 lb. white calcined tartar, 1 lb. Venice or other glaſs, 16 lb. and zaffer, half a pound: mix them well together; and after melting quench them in water, and then melt them again; which operation is to be repeated ſeveral times; and if you would have it fine and good, it will be proper to put the mixture into a glaſs furnace for a day or two. 3. A brown glazing may be given with a mixture of lead-glaſs, 12 parts, and common glaſs and mangane ſe, of each one part. 4. A citron-yellow may be made of 6 parts of red-lead, 7 parts of fine red brick-duſt, and 2 parts of antimony, all melted together. 5. A fleſh-colour, with 12 parts of lead-aſhes, and 1 of white glaſs. 6. For a green-colour, take 8 parts of litharge, 8 parts of Venice glaſs, 4 parts of braſs duſt, and melt them together for uſe; or melt together 2 parts yellow-glaſs, with as much copper-duſt. 7. For a gold yellow, take of antimony, red lead, and ſand, an equal quantity, and melt them into a cake. 8. For a fine purple brown, take lead-aſhes, 15 parts; clear ſand, 18; manganeſe, 1; white-glaſs, 15 meaſures; and one of zaffer. 9. For a fine red, take antimony, 2 lb. litharge, 3 lb. ruſt of iron calcined, 1 lb. and grind them to a fine powder. 10. For a fine white glazing, take 2 lb. of lead, 1 lb. of tin, and calcine them to aſhes; of which take 2 parts; of calcined flint or pebble, 1 part; of ſalt, 1 part; and mixing them well together, melt them into a cake. At Rotterdam, they make a fine ſhining white glazing, by melting together 2 lb. clean tin-aſhes, 10 lb. lead-aſhes, 2 lb. fine Venice-glaſs, and ½ lb. tartar. 11. A yellow glazing is made of 4 ounces of red-lead, and 2 ounces of antimony, melted together. 12. For a fine yellow, take red lead, 3 pints; antimony and tin, of each 2 lb. then melting them into a cake, grind it fine; and repeating this ſeveral times, you will have a good yellow.

GLEAD, or GLADE, in ornithology, a name uſed in ſome parts of the kingdom for the milvus, or kite. See MILVUS.

GLEAM, among falconers, is ſaid of a hawk, when ſhe caſts or throws up filth from her gorge.

GLEBE, among miners, ſignifies a piece of earth, wherein is contained ſome mineral ore. See the article ORE.

GLEBE, in law, the land belonging to a pariſh church, beſides the tithes.

When a parſon or vicar has cauſed any of his glebe-lands to be manured and ſown, at his own charge, with corn or grain, he may by will deviſe all the profits and corn growing upon the ſaid glebe; and in caſe he dies without diſpoſing thereof, his executors ſhall have the ſame.

GLECHOMA, in botany, the name by which Linnæus calls ground-ivy, a plant belonging to the didynamia-gymnoſpermia claſs, the flower of which is monopetalous and ringent: there is no pericarpium; the ſeeds, which are oval and four in number, being contained in the cup. The flowers are moderately large, and of a beautiful blue. See GROUND IVY.

GLEDITSIA, in botany, a genus of the dioecia-hexandria claſs of plants, the flower of which conſiſts of four petals, and is arranged in the form of an amentum: the fruit is a very large pod, ſeparated by partitions into diſtinct cells, which are full of a pulpy matter: the ſeeds are ſolitary, roundiſh, hard and ſhining.

GLEET, in medicine, the flux of a thin limpid humour from the urethra.

Many imagine that the prodigious increaſe of certain gleets at particular times, laſting only for two or three days, and then ſuddenly abating to their wonted quantity, is inconſiſtent with a purulent diſcharge; and, therefore, conclude a gleet to be nothing but a præternatural excretion from the relaxed veſſels of the urethra. For the cure of venereal gleets, the uſe of a bougie is recommended, as are aſtringent injections, beginning with weak ones, and gradually increaſing their ſtrength. Aſtruc recommends milk, drank morning and evening for ſome time; then mineral waters, whether chalybeate or vitriolic, for fifteen or twenty days; and afterwards balſamics, to deterge and cicatrize the ulcers concealed in the urethra; and, laſt of all, aſtringents, to dry up the ulcers, and recover the tone of the parts; ſuch as infuſions of the leaves of mint, horehound, agrimony, plantain, ſhepherd's purſe, ſage, &c. Turner recommends the cold bath, Spaw, Pyrmont, and Briſtol waters. Heiſter, for an injection, recommends lime-water, with a little ſugar of lead, or lime-water, with a little camphorated ſpirit of wine. Turner, when there is any ſuſpicion of a remaining virulence, adds calomel to the lime-water.

GLENE, γλήνη, in anatomy, a ſhallow cavity of any bone, which receives another bone in articulation. It alſo ſignifies the cavity or ſocket of the eye.

GLENOIDES, the name of two cavities, or ſmall depreſſions, in the inferior part of the firſt vertebra of the neck.

GLESUM, a name antiently given to amber. See the article AMBER.

GLINUS, in botany, a genus of the dodecandria-trigynia claſs of plants, the calyx of which conſiſts of five oval, concave, permanent leaves: there is no corolla; the

Fig. 1. The Terrestial GLOBE

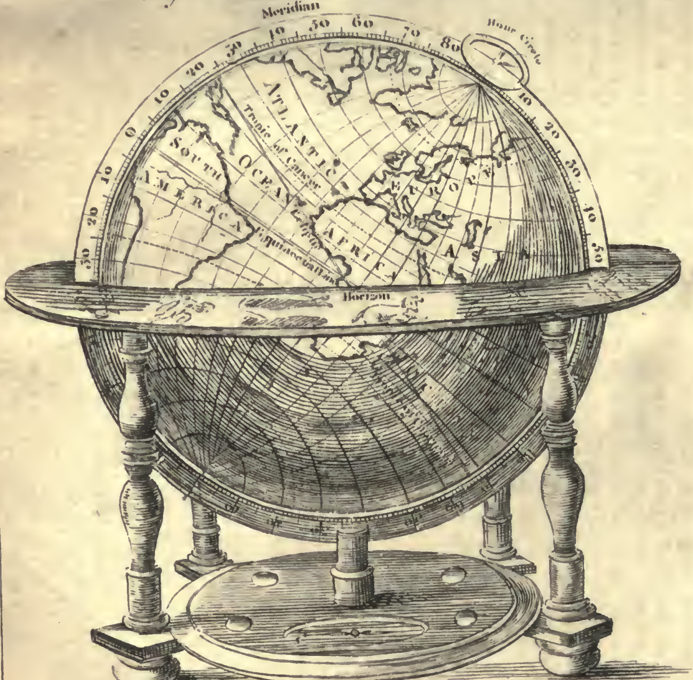
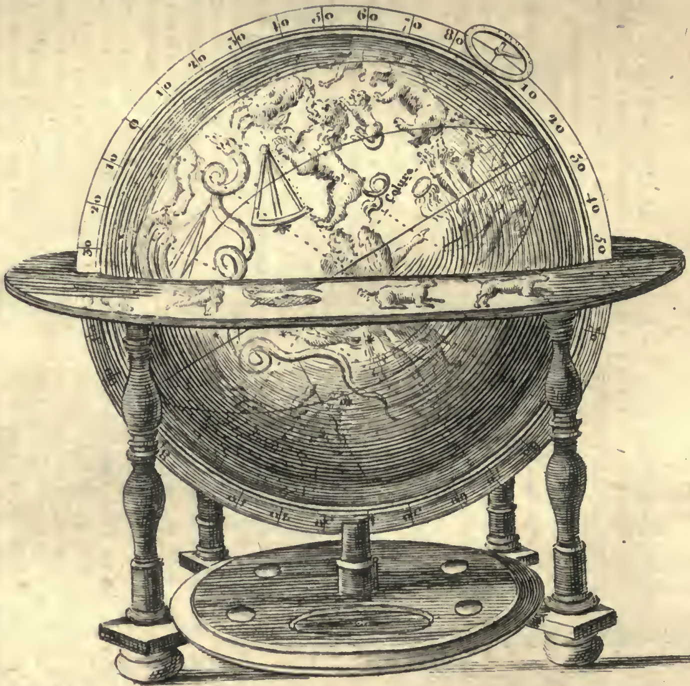


Fig. 2. The Celestial GLOBE.



facing page 1439

J. Jefferys sculp

the fruit is an oval, five cornered capſule, compoſed of five valves, and containing five cells: the ſeeds are numerous and roundiſh.

GLIS, in zoology, a name given by ſome to the common rat, as alſo to the rell and dor-mouſe. See MUS and RAT.

The fleſh of the rell-mouſe is recommended for a bulimy; and its fat, rubbed on the feet, is ſaid to procure ſleep.

GLISCHROMICTHES, in natural hiſtory, the name by which Dr. Hill calls the tougher and more viſcid loams. See the article LOAMS.

Of this genus there are ſeveral ſpecies. 1. The greyiſh-white gliſchromicthes, of a denſe and compact texture: this raiſes a great efferveſcence with aqua-fortis, and makes a very valuable brick; but requires ſo much working, that it is ſeldom uſed alone. 2. The pale yellow gliſchromicthes: this raiſes no efferveſcence with aqua-fortis, but makes a fine red brick. 3. The yellowiſh-brown gliſchromicthes, which raiſes no efferveſcence with aqua-fortis, and makes a very good brick, but is ſeldom uſed alone. 4. The reddiſh-brown gliſchromicthes. It raiſes no efferveſcence with aqua-fortis, and though uſed in brick-making, makes but a ſoft and coarſe kind.

GLISTER, in ſurgery, the ſame with clyſter. See the article CLYSTER.

GLOBE, in geometry, the ſame with ſphere. See the article SPHERE.

GLOBE, in practical mathematics, an artificial ſpherical body, on the convex ſurface of which are repreſented the countries, ſeas, &c. of our earth; or the face of the heavens, the circles of the ſphere, &c. That with the parts of the earth delineated upon its ſurface, is called the terreſtrial globe; and that with the conſtellations, &c. the celeſtial globe. Theſe globes are placed in frames, with other appurtenances, as repreſented in plate CXVI. fig. 1. and 2. Their principal uſe, beſides ſerving as maps to diſtinguiſh the outward parts of the earth, and the ſituation of the fixed ſtars, is to illuſtrate and explain the phænomena ariſing from the diurnal motion of the earth. See the the article DIURNAL.

Conſtruction and deſcription of the GLOBES.

The globes commonly uſed are made of paſteboard, or paper, fitted to a ſpherical mold. After this covering is formed to the artificer's mind, it is divided, by inciſion, along the middle, and taken off the mold in the form of two caps, or hemiſpheres. Theſe are next fitted upon a wooden axis, with iron-poles; and, being firmly ſewed together, are afterwards paſted over with a compoſition made of whiting and glue, till the globe become perfectly ſpherical and ſmooth. This done, a map of the earth, or of the heavens, is projected in ſeveral gores, which being paſted on, the whole is coloured and varniſhed. Thus finiſhed, the globe is hung in a brazen meridian, moveable within a wooden horizon, and fitted with a horary circle, quadrant of altitude, &c.

There are ten principal circles repreſented upon globes, *viz* ſix greater and four leſſer ones. The greater circles are the horizon, meridian, equinoctial, as it is called on the celeſtial, and equator on the terreſtrial globe, the ecliptic drawn along the middle of the zodiac, and the two colures. See the articles HORIZON, MERIDIAN, &c.

The leſſer circles, of principal uſe, are the two tropics and two polar circles. See CIRCLE, TROPIC, and POLAR.

Of theſe circles ſome are fixed, and always obtain the ſame poſition; others moveable, according to the poſition of the obſerver. The fixed circles are the equator and ecliptic, with their parallels and ſecondaries; which are uſually delineated upon the ſurface of the globes. The moveable circles are the horizon, with its parallels and ſecondaries.

The horizon is that great and broad wooden circle ſurrounding the globe, and dividing it into two equal parts, called the upper and lower hemiſpheres. It has two notches, to let the brazen meridian ſlip up and down, according to the different heights of the pole. On the flat ſide of this circle are deſcribed the twelve ſigns, the months of the year, the points of the compaſs, &c. The brazen meridian is an annulus or ring of braſs, divided into degrees, as repreſented in the figure. It divides the globe into two equal parts, called the eaſtern and weſtern hemiſpheres. The quadrant of altitude is a thin pliable plate of braſs, anſwering exactly to a quadrant of the meridian. It is divided into 90°, and has a notch, nut and ſcrew, to fix to the brazen meridian in the zenith of any place; where it turns round a pivot, and ſupplies the room of vertical circles. The hour-circle is a flat ring of braſs, divided into twenty-four equal parts, or hour-diſtances; and on the pole of the globe is fixed an index, that turns round with the globe, and points out the hours upon the hour-circle. Laſtly, there is generally added a compaſs and needle upon the pediment of the frame.

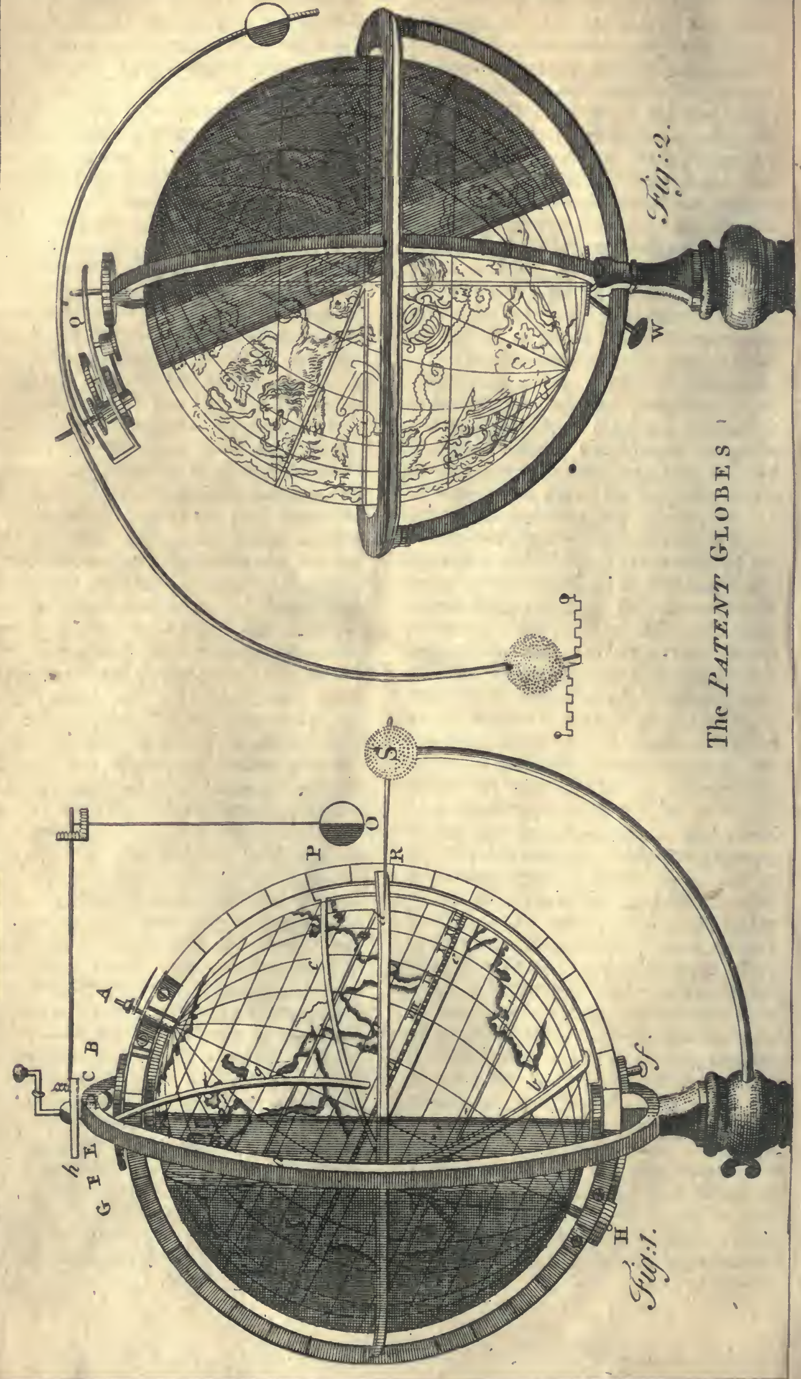
The ſurface of the celeſtial globe may be eſteemed a juſt repreſentation of the concave expanſe of the heavens, notwithſtanding its convexity; for it is eaſy to conceive the eye placed in the center of the globe, and viewing the ſtars on its ſurface; ſuppoſing it made of glaſs, as ſome globes are: alſo that if holes were made in the center of each ſtar, the eye in the center of the globe, properly placed, would view through each of the holes the very ſtars in the heavens repreſented by them.

As it would be impoſſible to have any diſtinct notion of the ſtars, in reſpect of their number, order, and diſtances, without arranging them in certain forms, called conſtellations, this the firſt obſervers of the heavens took care to do; and theſe, like kingdoms and countries upon the terreſtrial globe, ſerve to diſtinguiſh the different parts of the ſuperficies of the celeſtial globe. See CONSTELLATION.

The ſtars, therefore, are all diſpoſed in conſtellations under the forms of various animals, whoſe names and figures are repreſented on the celeſtial globe; which were firſt invented by the antient aſtronomers and poets, and are ſtill retained for the better diſtinction of theſe luminaries.

Problems on the celeſtial GLOBE. 1. *To rectify the globe.* Raiſe or elevate the pole to the latitude of the place; ſcrew the quadrant of altitude in the zenith; ſet the index of the hour-circle to the upper XII; and place the globe north and ſouth by the compaſs and needle; then is it a juſt repreſentation of the heavens from the given day at noon. 2. *To find the ſun's place in the ecliptic.* Find the day of the month in the calendar on the horizon, and right againſt it is the degree of the ecliptic which the ſun is in for that day. 3. *To find the ſun's declination.* Rectify the globe, bring the ſun's place in the ecliptic to the meridian, and that degree which it cuts in the meridian is the declination required. 4. *To find the ſun's right aſcenſion.* Bring the ſun's place to the meridian, and the degree of the equinoctial cut by the meridian, is the right aſcenſion required. 5. *To find the ſun's amplitude.* Bring the ſun's place to the horizon, and the arch of the horizon intercepted between it and the eaſt or weſt point, is the amplitude, north or ſouth. 6. *To find the ſun's altitude for any given day and hour.* Bring the ſun's place to the meridian; ſet the hour-index to the upper XII; then turn the globe till the index points to the given hour, where let it ſtand; then ſcrewing the quadrant of altitude in the zenith, lay it over the ſun's place, and the arch contained between it and the horizon, will give the degrees of altitude required. 7. *To find the ſun's azimuth for any hour of the day.* Every thing being done as in the laſt problem, the arch of the horizon contained between the north point, and that where the quadrant of altitude cuts it, is the azimuth eaſt or weſt, as required. 8. *To find the time when the ſun riſes or ſets.* Find the ſun's place for the given day; bring it to the meridian, and ſet the hour-hand to XII; then turn the globe till the ſun's place touches the eaſt part of the horizon, the index will ſhew the hour of its riſing: after that, turn the globe to the weſt part of the horizon, and the index will ſhew the time of its ſetting for the given day. 9. *To find the length of any given day or night.* This is eaſily known by taking the number of hours between the riſing and ſetting of the ſun for the length of the day; and the reſidue, to 24, for the length of the night. 10. *To find the hour of the day, having the ſun's altitude given.* Bring the ſun's place to the meridian, and ſet the hour-hand to XII; then turn the globe in ſuch a manner, that the ſun's place may move along by the quadrant of altitude (fixed in the zenith) till it touches the degree of the given altitude; where ſtop it, and the index will ſhew on the horary circle the hour required. 11. *To find the place of the moon, or any planet, for any given day.* Take Parker's or Weaver's ephemeris, and againſt the given day of the month you will find the degree and minute of the ſign which the moon or planet poſſeſſes at noon, under the title of geocentric motions. The degree thus found being marked in the ecliptic on the globe by a ſmall notch, or otherwiſe, you may then proceed to find the declination, right aſcenſion, latitude, longitude, altitude, azimuth, riſing, ſouthing, ſetting, &c. in the ſame manner as has been ſhewn for the ſun. 12. *To explain the phænomena of the harveſt moon.* In order to this we need only conſider, that when the ſun is in the beginning of aries, the full moon on that day muſt be in the beginning of libra: and ſince when the ſun ſets, or moon riſes, on that day, thoſe equinoctial points will be in the horizon, and the ecliptic will then be leaſt of all inclined thereto, the part or arch which the moon deſcribes in one day, *viz.* 13°, will take up about an hour and a quarter aſcending above the horizon; and, therefore, ſo long will be the time after ſun-ſet, the next night, before the moon will riſe. But at the oppoſite time of the year, when the ſun is in the autumnal, and the full moon in the vernal equinox, the ecliptic will, when the ſun is ſetting, have the greateſt inclination to the horizon; and, therefore, 13° will in this caſe ſoon aſcend, *viz.* in about a quarter of an hour; and ſo long after ſun-ſet will the moon riſe the next day after the full: whence, at this time of the year, there is much more moon-light than in the ſpring; and hence this autumnal full moon came to be called the harveſt moon, the hunter's or ſhepherd's moon: all which will be clearly ſhewn on the globe. 13. *To repreſent the face of the ſtarry firmament for any given hour of the night.* Rectify the globe, and turn it about, till the index points to the given hour; then will all the upper hemiſphere of the globe repreſent the viſible half of the heavens, and all the ſtars on the globe will be in ſuch ſituations as exactly correſpond to thoſe in the heavens; which may therefore be eaſily found, as will be ſhewn in the ſixteenth problem. 14. *To find the hour when any known ſtar will riſe, or come upon the meridian.* Rectify the globe, and ſet the index to XII; then turn the globe till the ſtar comes to the horizon or meridian, and the index will ſhew the hour required. 15. *To find at what time of the year any given ſtar will be on the meridian at* XII *at night.* Bring the ſtar to the meridian, and obſerve what degree of the ecliptic is on the north meridian under the horizon; then find in the calendar on the horizon the day of the year againſt that degree, and it will be the day required. 16. *To find any particular ſtar.* Firſt find its altitude in the heavens by a quadrant, and the point of the compaſs it bears on; then, the globe being rectified, and the index turned to the given hour, if the quadrant of altitude be fixed on the zenith, and laid towards the point of the compaſs on which the ſtar was obſerved, the ſtar required will be found at the ſame degree of altitude on the ſaid quadrant, as it was by obſervation in the heavens.

Problems on the terreſtrial GLOBE. 1. *To find the latitude of any place.* Bring the given place to the brazen meridian, and obſerve what degree it is under, for that is the latitude required. 2. *To rectify the globe for any given place.* Raiſe the pole ſo many degrees above the horizon, as are equal to the latitude of the place; then, finding the ſun's place, bring it to the meridian; and proceed, as directed in problem 1. on the celeſtial globe. 3. *To find the longitude of a given place.* Bring the place to the brazen meridian, and obſerve the degree of the equator under the ſame, for that expreſſes the longitude required. 4. *To find any place by the latitude and longitude given.* Bring the given degree of longitude to the meridian, and under the given degree of latitude you will ſee the place required. 5. *To find all thoſe places which have the ſame latitude, or longitude, with thoſe of any given place.* Bring the given place to the meridian, then all thoſe places which lie under the meridian have the ſame longitude; again, turn the globe round on its axis, then all thoſe places, which paſs under the ſame degree of the meridian with any given place, have the ſame latitude with it. 6. *To find all thoſe places where it is noon at any given hour of the day, in any place.* Bring the given place to the meridian; ſet the index to the given hour; then turn the globe, till the ſaid index points to the upper XII; and obſerve what places lie under the braſs meridian, for to them it is noon at that time. 7. *When it is noon at any one place, to find what hour it is at any other given place.* Bring the firſt given place to the meridian, and ſet the index to the upper XII; then turn the globe till the other given place comes to the meridian, and the index will point to the hour required. 8. *For any given hour of the day in the place where you are, to find the hour of the day in any other place.* Bring the place where you are to the meridian, ſet the index to the given hour, then turn the globe about, and when the other place comes to the meridian, the index will ſhew the hour of the day there, as required. 9. *To find the diſtance between any two places on the globe in engliſh miles.* Bring one place to the meridian, over which fix the quadrant of altitude; and then laying it over the other place, count the number of degrees thereon contained between them; which number multiply by $69\frac{1}{2}$, (the number of miles in one degree) and the product is the number of engliſh miles required. 10. *To find how any one place bears from another.* Bring one place to the braſs meridian, and lay the quadrant of altitude over the other; and it will ſhew on the horizon the point of the compaſs on which the latter bears from the former. 11. *To find thoſe places to which the ſun is vertical in the torrid zone, for any given day.* Find the ſun's place in the ecliptic for the given time, and bring it to the meridian, and obſerve what degree thereof it cuts; then turn the globe about, and all thoſe places which paſs under that degree of the meridian, are thoſe required. 12. *To find what day of the year the ſun will be vertical to any given place in the torrid zone.* Bring the given place to the meridian, and mark the degree exactly over it; then turn the globe round, and obſerve the two points of the ecliptic which paſs under that degree of the meridian: laſtly, ſee on the wooden horizon on what days of the year the ſun is in thoſe points of the ecliptic; for thoſe are the days required. 13. *To find thoſe places in the north frigid zone, where the ſun begins to ſhine conſtantly without ſetting, on any given day between the 21ſt of March and the 21ſt of June.* Find the ſun's place in the ecliptic for the given day; bring it to the general meridian, and obſerve the degrees of declination; then all thoſe places which are the ſame number of degrees diſtant from the pole, are the places required to be found. 14. *To find on what day the ſun begins to ſhine conſtantly without ſetting, on any given place in the north frigid zone, and how long.* Rectify the globe to the latitude of the place; and, turning it about, obſerve what point of the ecliptic between aries and cancer, and alſo between cancer and libra, coincides with the north point of the horizon; then find, by the calendar on the horizon, what days the ſun will enter thoſe degrees of the ecliptic, and they will ſatisfy the problem. 15. *To find the place over which the ſun is vertical, on any given day and hour.* Find the ſun's place, and bring it to the meridian, and mark the degree of declination for the given hour; then find thoſe places which have the ſun in the meridian at that moment; and among them, that which paſſes under the degree of declination, is the place deſired. 16. *To find, for any given day and hour, thoſe places wherein the ſun is then riſing and ſetting, or on the meridian; alſo thoſe places which are enlightened, and thoſe which are not.* Find the place to which the ſun is vertical at the given time, and bring the ſame to the meridian, and elevate the pole to the latitude of the place; then all thoſe places which are in the weſtern ſemicircle of the horizon have the ſun riſing, and thoſe in the eaſtern ſemicircle ſee it ſetting; and to thoſe under the meridian, it is noon. Laſtly, all places above the horizon are enlightened, and all below it are in darkneſs or night. 17. *The day and hour of a ſolar or lunar eclipſe being given, to find all thoſe places in which the ſame will be viſible.* Find the place to which the ſun is vertical at the given inſtant, and elevate the globe to the latitude of the place; then in moſt of thoſe places above the horizon will the ſun be viſible during his eclipſe; and all thoſe places below the horizon, will ſee the moon paſs through the ſhadow of the earth in her eclipſe. 18. *The length of a degree being given, to find the number of miles in a great circle of the earth, and thence the diameter of the earth.* Admit that one degree contains $69\frac{1}{2}$ engliſh ſtatute miles; then multiply 360 (the number of degrees in a great circle) by $69\frac{1}{2}$, and the product will be 25020, the miles which meaſure the circumference of the earth. If this number be divided by 3.1416, the quotient will be $7963\frac{86}{100}$ miles, for the diameter of the earth. 19. *The diameter of the earth being known, to find the ſurface in ſquare miles, and its ſolidity in cubic miles.* Admit the diameter be 7964 miles; then multiply the ſquare of the diameter by 3.1416, and the product will be 199250205 very near, which are the ſquare miles in the ſurface of the earth. Again, multiply the cube of the diameter by 0.5236, and the product 264466789170 will be the number of the cubic miles in the whole globe of the earth. 20. *To expreſs the velocity of the diurnal motion of the earth.* Since a place in the equator deſcribes a circle of 25020 miles in twenty-four hours, it is evident that the velocity with which it moves is at the rate of $1042\frac{1}{2}$ in one hour, or $17\frac{3}{10}$ miles per minute. The velocity in any parallel of latitude, decreaſes



The PATENT GLOBES

T. Jefferys Sculp.

creaſes in the proportion of the co-ſine of the latitude to the radius. Thus for the latitude of London, $51^\circ\ 30'$, ſay,

As radius	10.000000
To the co-ſine of lat. $51^\circ\ 30'$	9.794149
So is the velocity in the equator, $17\frac{3}{10}'$	2.232046
To the velocity of the city of London, $10\frac{8}{10}'$	2.032195

That is, the city of London moves about the axis of the earth at the rate of $10\frac{8}{10}$ miles every minute of time. But this is far ſhort of the velocity of the annual motion about the ſun; for that is at the rate of 60000 miles per hour, or about 1000 miles each minute, ſuppoſing the diameter of the annual orbit to be 82 millions of miles.

Patent-GLOBES, thoſe with Mr. Neale's improvements, for which he obtained his majeſty's letters-patent.

The terreſtrial globe, with the improvements of this ingenious artiſt, is repreſented in plate CXVII. fig. 1. the earth being ſuppoſed in that part of its orbit where the north pole A is at its neareſt approach to the ſun S, which accordingly by the index or ray S R, points to the tropic of cancer; *b* is a moveable circle, which, ſet to the latitude of a given place, will cauſe the ſemicircle *c* to point out the zenith of the ſaid place; *d* repreſents the ecliptic, *e* the equator, and *f* a ſcrew by which the annual motion may be ſeparated from the diurnal; *g* is a ſemicircle which always moves at 90° diſtance from the moon, and thereby becomes the lunar horizon for the northern hemiſphere; *b* is an inclined plane on which the ſtem of the moon P O moves, thereby cauſing the moon itſelf to ſhew its ſeveral latitudes, nodes, *&c.* and by this plane moving the contrary way, in a little more than 19 of the annual revolutions of the globe, is ſhewn the retrograde motion of the nodes.

This globe is mounted with the horizon *a* fixed vertically, and placed ſo as to move upon its own axis A H, whereby it repreſents the diurnal motion of the earth. Hence if the globe be turned round its own axis, by means of the winch at top, the ray from the ſun will, in this ſituation, deſcribe the tropic of cancer: the whole arctic circle will be taken into the enlightened hemiſphere, and that of the antarctic circle will be involved in darkneſs. Let us now ſuppoſe the globe turned thirty times about by the winch, the north pole will then be ſituated as at B, and the index from the ſun will point to the ſign leo on the ecliptic *d*: after turning the globe thirty times more, the north pole will be removed to C, and the index advanced to virgo; and in this manner may the phænomena of the earth's annual motion be traced through all the ſigns of the ecliptic and ſeaſons of the year; the index or pointer deſcribing a ſpiral line, which every day at noon, or turn of the globe, falls at the diſtance of about fifteen minutes from that of the preceding day. When the earth is ſo far advanced in its orbit, that the index S R points to the equator, the reaſon will appear very clear why the days and nights are then equal all the world over; for both poles are now ſeen in the horizon, which, being the boundary of light and darkneſs, biſſects all the parallels of latitude, and cauſes an equal diſtribution of day and night throughout the whole earth.

If the rotation of the globe be continued, the obſerver will ſee the north pole deſcend juſt as many degrees below the horizon, as the pointer has advanced ſouth of the equator; and when it is arrived at the tropic of capricorn, all that part of the globe within the arctic circle will be involved in continual darkneſs, whilſt that within the antarctic circle enjoys uninterrupted day.

At the diſtance of 90° from the moon, as has been already obſerved, is placed a ſemicircle, which being fixed on the center of the moon's motion, always moves round with her; thereby ſhewing, throughout her courſe, all thoſe countries in the northern hemiſphere to which ſhe is at any particular time riſing, thoſe where ſhe is then ſetting, and thoſe to whom ſhe is then due ſouth; as alſo the exact difference of time between the riſing or ſetting of the ſun and moon.

The celeſtial globe (*ibid.* fig. 2.) is mounted not quite ſo differently from the common globes, as the terreſtrial one; its horizon being as uſual, and the globe moveable to the latitude of any country; only inſtead of thoſe upright pillars to ſupport the horizon, as in common ones, here ſemicircles are fixed on the pedeſtal, and from the pole of the equator a motion is conveyed to the pole of the ecliptic; where two arms or indices are placed, on which are fixed the artificial ſun and moon. Theſe, as the globe is turned about its axis by the winch W, keep their exact motions over the ſame, by means of the wheel-work at Q, in like manner as thoſe luminaries do in the heavens; ſo that being once ſet right by an ephemeris, they will remain ſo, and thereby ſhew the riſing and ſetting of theſe luminaries, with the length of the day and night, together with the true cauſe of all the viciſſitudes of the ſeaſons; and how, notwithſtanding their apparent motion from eaſt to weſt, they really move from weſt to eaſt; the moon, in a very little more than twenty-nine days and a half; and the ſun, in a year. See the articles EARTH, SUN, and MOON.

To the center of the ſun two jointed ſtems are occaſionally ſcrewed on, and to theſe are fixed mercury and venus; which by the ſaid joints may be ſet to their proper ſtations, and thereby ſeveral entertaining problems may be ſolved.

From what has been ſaid it is evident, that the uſual problems on the common globes, and moſt of thoſe with the orrery, may be ſolved by theſe curious machines.

Problems peculiar to the patent-GLOBES. 1. *To rectify theſe globes.* This, on the celeſtial globe, is performed in the ſame manner as on the common globes. But the terreſtrial globe admits of no ſuch rectification; for inſtead of raiſing or lowering the pole of the globe itſelf, according to the latitude of the place, we muſt here rectify a moveable braſs horizon, ſo as that the given place ſhall be in the zenith of the ſaid horizon. 2. *To rectify the ſun or moon, according to theſe globes.* Having found the ſun's place in the ecliptic, in the common way, turn the ſun about by its ſtem till it is directly oppoſite to the ſame ſign and degree of the ecliptic upon the globe. The ſame may alſo be done with reſpect to the moon, having firſt found her place by an ephemeris for that day. 3. *To ſhew on theſe globes the cauſe of an eclipſe of the ſun or moon.* This is ſelf-evident on either globe, by turning them by the winch till the two luminaries come in conjunction with, or oppoſition to each other, provided they happen to be in or near the nodes. 4. *To explain the reaſon why they happen no oftener.* This will appear no leſs evident, by ſetting the moon to any conſiderable latitude, and turning the globe till ſhe comes in conjunction with the ſun; for then the pointer from the ſun will be ſeen to paſs either above or below her, according as ſhe is in north or ſouth latitude; ſo that there can be no eclipſe of the ſun, when the moon is not in or near her nodes. 5. *To exhibit a natural repreſentation of the retrograde motion of the moon's nodes.* This is done by only turning the globe with the winch, and obſerving that the place where the moon croſſes the ecliptic, in its motion round the earth, is every time in different places; which are found to be retrograde, or contrary to the order of the ſigns; that is, they move backward thro' all the ſigns from eaſt to weſt. 6. *The day and hour of a ſolar eclipſe being given, to find all thoſe places on the globe to which the ſame will be viſible.* Turn the globe till the given day comes oppoſite to the ſun, and the place where you are to the pointer; ſet the index to 12, then turn the globe till the index points to the given hour; ſet the moon in conjunction with the ſun: then all the places above the ſolar horizon are thoſe to which the eclipſe will be viſible. 7. *To find the ſame in a lunar eclipſe.* Proceed as in the laſt problem; only inſtead of the moon's being in conjunction, ſhe muſt now be in oppoſition; and inſtead of viewing all the countries on that ſide of the horizon towards the ſun, you muſt ſurvey thoſe on the oppoſite ſide: for they are the countries to which the lunar eclipſe will be viſible. 8. *To exhibit the phaſes of mercury and venus.* Set them to any given ſtation within the enlightened hemiſphere of the celeſtial globe; and it may be obſerved, that their different phaſes in thoſe ſeveral ſtations will be in all reſpects analogous to thoſe of our moon. 9. *To demonſtrate, that in a certain latitude, the inhabitants may obſerve the ſun, moon, mercury, and venus all riſing together on a particular day; and yet, on the ſame day, may ſee the moon ſet twelve hours before the ſun, mercury fourteen hours after the moon, and venus ſix hours after all three.* Rectify the globe to the latitude of 66½; let the moon riſe near the tropic of capricorn, the ſun at the beginning of aries, mercury about fifteen degrees in aries, and venus about eighteen degrees in taurus, with five or ſix degrees of north latitude; then turn the globe about, and you will find by the index the difference of time ſought for. 10. *To find the height of the diurnal arch of the luminaries and planets aforeſaid, on any given day.* The globe being rectified, ſcrew the quadrant of altitude to the zenith of the place, which bring to the meridian; then turn about the globe to the given day, and the degree of the quadrant, each reſpectively paſs over, is the height of their arches ſought. 10. *To ſhew why neither mercury nor venus can be ſeen on the meridian of London at midnight, as all the other planets at certain times are.* Set theſe two planets to their greateſt elongation or diſtance from the ſun; and, by turning the globe about, the impoſſibility of the thing will be evident.

Globe fish, *orbis*. See Orbis.

GLOBULAR, in general, an appellation given to things of a roundiſh figure, like that of a globe.

Globular chart, a name given to the repreſentation of the ſurface, or of ſome part of the ſurface of the terreſtrial globe upon a plane, wherein the parallels of latitude are circles nearly concentric, the meridians curves bending towards the poles, and the rhumb-lines are alſo curves. See the article Chart.

Globular sailing. See Sailing.

GLOBULARIA, in botany, a genus of plants of the tetrandria-monogynia claſs, the proper flower of which is formed of a ſingle petal, tubular at the baſe, and divided into five ſegments at the limb; the univerſal corolla is nearly equal; there is no pericarpium, but the proper perianthium cloſes at its top, and contains the ſeed, which is ſingle, and of an oval figure.

Of this genus there are ſeveral ſpecies, among which that called by ſome the alypum of Montpelier, is a violent cathartic and emetic, and is ſometimes given in dropſies with ſucceſs; but it ought to be uſed with great caution: its bark contains its principal virtues.

GLOBULE, a diminutive of globe, frequently uſed by phyſicians in ſpeaking of the red ſpherical particles of the blood. See the article Blood.

GLOCESTER, the capital of Gloceſterſhire, ninety miles weſt of London: weſt long. 2° 16′, and north lat. 51° 50′.

It is a biſhop's ſee, and ſends two members to parliament.

GLOGAW, a city of Sileſia, ſituated on the river Oder, 45 miles north-weſt of Breſlaw: eaſt long. 16° 8′, and north lat. 51° 40′.

Leſſer Glogaw, a town of Sileſia, fifty miles ſouth of Breſlaw.

GLORIA patri, among eccleſiaſtical writers. See Doxology.

GLORIOSA, superb lilly, in botany, a genus of the hexandria-monogynia claſs of plants, the flower of which conſiſts of of ſix oblongo-lanceolated, undulated, and very long petals, reflex nearly to the baſe; the fruit is an oval pellucid capſule, containing three cells, and numerous globoſe ſeeds, diſpoſed in a double ſeries.

GLOSS, in matters of literature, denotes an expoſition or explication of the text of any author, whether in the ſame language, or any other; in which ſenſe it differs little from commentary. See the article Commentary.

Gloss, among artificers, the luſtre or brightneſs ſet upon cloth, ſilk, and the like. See Cloth, Silk, *&c.*

GLOSSARY, *gloſſarium*, a ſort of dictionary, explaining the obſcure and antiquated terms in ſome old author; ſuch are Du Cange's latin and greek gloſſaries, Spelman's Gloſſary, and Kennet's Gloſſary at the end of his Parochial Antiquities.

GLOSSOCOMON, in ſurgery, an inſtrument, or ſort of caſe, contrived by the antient ſurgeons, for containing a fractured leg or thigh.

Glossocomon, in mechanics, the name by which Hiero calls a machine, compoſed of ſeveral dented wheels with pinions, and uſed for raiſing great weights.

GLOSSOPETRA, in natural hiſtory, a genus of extraneous foſſils, ſo called from their having been ſuppoſed the tongues of ſerpents turned to ſtone, tho' they are really the teeth of ſharks, and are daily found in the mouths of thoſe fiſhes, wherever taken. See Fossil.

The ſeveral ſizes of teeth of the ſame ſpecies, and the ſeveral different ſpecies of ſharks, furniſh us with a vaſt variety of theſe foſſile teeth. Their uſual colours are black, bluiſh, whitiſh, yellowiſh, or brown. In ſhape they are uſually ſomewhat approaching to triangular; ſome are ſimple, and others have a ſmaller point on each ſide the large one; many of them are quite ſtraight, but they are frequently met with crooked, and bent in all the different directions, ſome inwards, ſome outwards, and ſome ſideways: they are alſo of various ſizes, the larger ones being four or five inches long, and the ſmaller leſs than a quarter of an inch. See plate CXXIV. fig. 1.

They are found with us in the ſtrata of blue clay, and are very plentiful in the clay-pits of Richmond, and ſome other places; but they are no where ſo common as in the iſland of Malta.

GLOTTIS, in anatomy, the mouth or aperture of the larynx, through which the air aſcends and deſcends in reſpiring.

It is of an elliptic figure, and furniſhed with cartilages and muſcles, by means of which it is occaſionally dilated or ſtraitened, ſo as to give that wonderful variety of notes, of which the voice is capable, in ſpeaking and ſinging. See LARYNX.

GLOUCESTER, or GLOCESTER. See the article GLOCESTER.

GLOVE, a covering for the hand and wriſt.

Gloves, with reſpect to commerce, are diſtinguiſhed into leathern-gloves, ſilk-gloves, thread-gloves, cotton-gloves, worſted-gloves, *&c.* Leathern-gloves are made of chamois, kid, lamb, doe, elk, buff, *&c.*

Foreign gloves, on their importation, pay the following duties, *viz.* gloves of Canary, Milan, or Venice, unwrought, the dozen pair, pay 4 s. $9\frac{45}{100}$d. draw back 4 s. $3\frac{75}{100}$d. Thoſe of Canary, Milan, or Venice, wrought with gold or ſilver, the dozen pair, pay 19 s. $1\frac{80}{100}$d. draw back 17 s. 3 d. French gloves, the groſs, pay 1 l. 13 s. $10\frac{12\frac{1}{2}}{100}$d. draw back 1 l. $1\frac{87\frac{1}{2}}{100}$d. French, wrought with gold or ſilver, the dozen pair, pay 2 l. 14 s. $1\frac{80}{100}$d. draw back 1 l. 12 s. 3 d. Spaniſh gloves, plain, the dozen pair, pay 3 s. $7\frac{8\frac{3}{4}}{100}$d. draw back 3 s. $2\frac{81\frac{1}{4}}{100}$d. Silk-gloves knit, the dozen pair, pay 11 s. $5\frac{40}{100}$d. draw back 10 s. 6 d. More for every pound weight 1 s. $10\frac{50}{100}$d. draw back 1 s. $10\frac{50}{100}$d. Thoſe of Vandou, the dozen pair, pay 2 s. $4\frac{72\frac{1}{2}}{100}$d. draw back 2 s. $1\frac{87\frac{1}{2}}{100}$d. And more for ſuch as are made of leather, for every 20 s. value, upon oath, 6 s.

GLOUTIUS, in anatomy, a muſcle more uſually called the glutæus major.

GLOW-WORM, the engliſh name of an inſect, called by zoologiſts cicindela. See the article CICINDELA.

GLUCKSTAT, a fortified town of Germany, ſituated on the eaſt ſide of the river Elbe, thirty miles north-weſt of Hamburgh: eaſt longitude 9°, and north latitude 54° 20′.

GLUE, among artificers, a tenacious viſcid matter, which ſerves as a cement to bind or connect things together.

Glues are of different kinds, according to the various uſes they are deſigned for, as the common glue, glove-glue, and parchment-glue; whereof the two laſt are more properly called ſize. See SIZE.

The common or ſtrong glue is chiefly uſed by carpenters, joiners, cabinet-makers, *&c.* and the beſt kind is that made in England, in ſquare pieces of a ruddy brown colour; and, next to this, the flanders-glue. It is made of the ſkins of animals, as oxen, cows, calves, ſheep, *&c.* and the older the creature is, the better is the glue made of its hide. Indeed, whole ſkins are but rarely uſed for this purpoſe, but only the ſhavings, parings, or ſcraps of them; or the feet, ſinews, *&c.* That made of whole ſkins, however, is undoubtedly the beſt; as that made of ſinews is the very worſt.

The method of making GLUE. In making glue of parings, they firſt ſteep them two or three days in water; then waſhing them well out, they boil them to the conſiſtence of a thick jelly; which they paſs, while hot, through ozier-baſkets, to ſeparate the impurities from it, and then let ſtand ſome time, to purify it further: when all the filth and ordures are ſettled to the bottom of the veſſel, they melt and boil it a ſecond time. They next pour it into flat frames or moulds, whence it is taken out pretty hard and ſolid, and cut into ſquare pieces or cakes. They afterwards dry it, in the wind, in a ſort of coarſe net; and at laſt ſtring it, to finiſh its drying. The glue made of ſinews, feet, *&c.* is managed after the ſame manner; only with this difference, that they bone and ſcour the feet, and do not lay them to ſteep.

The beſt glue is that which is oldeſt; and the ſureſt way to try its goodneſs, is to lay a piece to ſteep three or four days, and if it ſwell conſiderably without melting, and when taken out reſumes its former drineſs, it is excellent.

A glue that will hold againſt fire or water, may be made thus: mix a handful of quick-lime with four ounces of linſeed-oil; boil them to a good thickneſs, then ſpread it on tin-plates in the ſhade, and it will become exceeding hard, but may be eaſily diſſolved over a fire, as glue, and will affect the buſineſs to admiration.

Method of preparing and uſing GLUE. Set a quart of water on the fire, then put in about half a pound of good glue, and boil them gently together till the glue be entirely diſſolved and of a due conſiſtence. When glue is to be uſed, it muſt be made thoroughly hot; after which, with a bruſh dipped in it, beſmear the faces of the joints as quick as poſſible; then clapping them together, ſlide or rub them lengthwiſe one upon another, two or three times, to ſettle them cloſe; and ſo let them ſtand till they are dry and firm.

Fiſh-**GLUE**, a name ſometimes given to ichthyocolla. See ICHTHYOCOLLA.

GLUME, *gluma*, among botaniſts, a kind of cup, conſiſting of two or three membranous valves, which are often pellucid at their edges. This ſort of cup belongs to the graſſes.

GLUTÆUS, in anatomy, the name of three muſcles, which form the buttocks, and from their ſize are called maximus, medius, and minimus. They all ariſe in the external ſurface of the ilium, iſchium, and os ſacrum: the termination of the firſt, or greateſt, is about four fingers-breadth from the great trochanter, and the terminations of the two others are in this trochanter.

GLUTINATIVE MEDICINES, the ſame with agglutinants. See AGGLUTINANTS.

GLYCINE, SCARLET-PEA, in botany, a genus of the diadelphia-decandria claſs of plants, with a papilionaceous flower, and an oblong bilocular pod, containing a number of kidney-ſhaped ſeeds, of a ſcarlet colour, ſpotted with black.

GLYCONIAN VERSE, in antient poetry, conſiſts of three feet, whereof the firſt is a ſpondee, the ſecond a choriambus, and the laſt a pyrrhichius; or the firſt may be a ſpondee, and the other two dactyls.

Thus, *Mens re-|gnum bona poſ | ſidet.*
or, *Mens re-|gnum bona | poſſidet.*

GLYCYRRHIZA, *liquorice*, in botany, a genus of the diadelphia-decandria claſs of plants, with a papilionaceous flower, conſiſting of four petals; the fruit is an oblong, compreſſed, and unilocular pod, containing a few kidney-ſhaped ſeeds. See plate CXIX. fig. 3.

For the deſcription and medicinal virtues of liquorice, ſee the article LIQUORICE.

GLYPH, in ſculpture and architecture, denotes any canal or cavity, uſed as an ornament.

GLYSTER, or CLYSTER, among phyſicians. See the article CLYSTER.

GMELINA, in botany, a genus of the didynamia-angioſpermia claſs of plants, the flower of which is campanulated, and alſo divided into four ſegments, the fruit is a globoſe unilocular berry, ſurrounding a bilocular nut or kernel.

GNAPHALIUM, *cudweed*, in botany, a genus of the ſyngeneſia-polygamia-ſuperflua claſs of plants, with numerous hermaphrodite flowers on its diſc, and a few female ones on the verge; there is no pericarpium; the ſeeds, which are oblong, ſingle, and crowned with down, being contained in the cup.

Cudweed is eſteemed drying and aſtringent, and is recommended in dyſenteries, hæmorrhages, and all kinds of fluxes; but the modern pharmacy makes little uſe of it.

GNAT, in zoology, an inſect of the fly-kind, called by authors culex. See the article CULEX.

There are ſeveral ſpecies of gnats, diſtinguiſhed partly by their ſize, and partly by the different colours with which they are variegated, as black, brown, grey, yellow; &c. They belong to the order of two-winged flies.

GNESNA, the capital city of great Poland, ſituated one hundred and ten miles weſt of Warſaw: eaſt long. 18°, and north lat. 53°.

It is the ſee of an archbiſhop, who is always primate of Poland. See the article POLAND.

GNIDIA, in botany, a genus of the octandria-monogynia claſs of plants, the flower of which conſiſts of four petals, inſerted into the cup; there is no pericarpium; the ſeed is ſingle, and retained in the bottom of the cup.

GNOME is often uſed in a ſynonymous ſenſe with apophthegm. See APOPHTHEGM.

GNOMES, *gnomi*, certain inviſible people, who, according to the cabbaliſts, inhabit the inner parts of the earth. They are ſuppoſed ſmall in ſtature, and the guardians of quarries, mines, &c. See the article CABBALISTS.

GNOMON, in dialling, the ſtyle, pin, or cock of a dial; which, by its ſhadow, ſhews the hour of the day. The gnomon of every dial repreſents the axis of the world. See DIAL and DIALLING.

GNOMON, in geometry. If, in a parallelogram ABCD (pl. CXVIII. fig. 1. nº 1.) the diameter AC be drawn; alſo two lines EF, HI, parallel to the ſides of the parallelogram, and cutting the diameter in one and the ſame point G, ſo that the parallelogram is, by theſe parallels, divided into four parallelograms, then are the two parallelograms DG, BG, through which the diameter does not paſs, called complements; thoſe through which the diameters paſs, EH, FI, are called the parallelograms about the diameter; and a gnomon conſiſts of the two complements, and either of the parallelograms about the diameter, *viz.* $GD+HE+EI$, or $GD+FI+GB$.

GNOMON, in aſtronomy, a ſtyle erected perpendicular to the horizon, in order to find the altitude of the ſun. Thus, in the right-angled triangle ABC *ibid.* n° 2. are given, AB the length of the ſtyle, BC the length of its ſhadow, and the right angle ABC. Hence, making CB the radius, we have this analogy for finding the angle ACB, the ſun's altitude, *viz.* BC : AB : : radius : tangent of the angle C.

By means of a gnomon, the ſun's meridian altitude, and conſequently the latitude of the place, may be found more exactly than with the ſmaller quadrants. See the article QUADRANT.

By the ſame inſtrument, the height of any object GH may be found; for as DF (*ibid.* n° 3.) the diſtance of the obſerver's eye from the gnomon, is to DE, the height of the ſtyle; ſo is FH, the diſtance of the obſerver's eye from the object, to GH, its height.

GNOMON *of a globe*, the index of the hour-circle. See the article GLOBE.

GNOMONIC, ſomething belonging to a gnomon. See the preceding article.

GNOMONIC COLUMN. See COLUMN.

GNOMONIC PROJECTION. See the article PROJECTION.

GNOMONICS, *gnomonica*, the art of dialing, or of drawing ſun and moon-dials, on any given plane. See the articles DIAL and DIALLING.

GNOSTICS, in church-hiſtory, chriſtian heretics ſo called, it being a name which almoſt all the ancient heretics affected to take, to expreſs that new knowledge and extraordinary light to which they made pretenſions; the word gnoſtic ſignifying a learned, or enlightened perſon.

St. Epiphanius aſcribes the origin of the gnoſtics to Simon Magus, and ſays that they acknowledged two principles, a good and a bad. They ſuppoſed there were eight different heavens, each of which was governed by its particular prince: the prince of the ſeventh heaven, whom they named Sabaoth, created the heavens and the earth, the ſix heavens below him, and a great number of angels. In the eighth heaven they placed their Barbelo, or Barbero, whom they ſometimes called the father and ſometimes the mother of the univerſe. All the gnoſtics diſtinguiſhed the creator of the univerſe from God, who made himſelf known to men by his Son, whom they acknowledged to be the Chriſt. They denied that the Word was made fleſh; and aſſerted that Jeſus Chriſt was not born of the Virgin Mary, that he had a body only in appearance, and that he did not ſuffer in reality. They neither believed a reſurrection, nor a judgment to come; but imagined that thoſe who had not been inſtructed in their maxims, would return into the world, and paſs into the bodies of hogs and other of the like animals. They had ſeveral apocryphal books, as the Goſpel of St. Philip, the Revelations of Adam, the Goſpel of Perfection, &c.

GO is ſometimes uſed in a ſpecial ſignification, in our law; as *to go without day*, is to be diſmiſſed the court.

GOA, a city and ſea-port of the hither India, ſituated in an iſland of the river Mandoua, and ſubject to the Portugueſe: eaſt long. 73° 20′, and north lat. 15° 20′.

GOAD, a pointed ſtick, or rod, armed with a ſharp iron pin at the end, to prick oxen or other cattle forwards.

GOAL, or GAOL. See GAOL.

GOAT, *capra*, in zoology, a quadruped of the order of the pecora. See the article CAPRA.

The common goat with carinated and arcuated horns, is nearly of the ſize of the ſheep, only that the wool of the latter makes it appear larger. The furr of the goat is of a pale dun, and the hairs rigid and waved, but not curled as in the ſheep. It is a native of moſt parts of Europe. The buck goat has under his jaws two wattles or tufts like a beard. The female alſo reſembles the male, and is valued if ſhe have large teats, a great udder, and no horns, or at leaſt very ſmall ones. Theſe animals require almoſt nothing to keep them. Their milk is eſteemed the greateſt nouriſher of all liquids, women's milk excepted, and very comfortable to the ſtomach. The young kids alſo are very good for the table, and may be managed in all reſpects like lambs.

GOAT'S BEARD, *tragopogon*, in botany. See the article TRAGOPOGON.

GOAT'S BLOOD, *ſanguis hirci*. See the article SANGUIS.

GOAT'S RUE, *galega*, in botany. See the article GALEGA.

GOAT-SUCKER, *caprimulgus*, in ornithology, a ſpecies of hirundo. See the article HIRUNDO.

GOAT'S THORN, the ſame with tragacanth.

GOBELINS, a celebrated manufactory for tapeſtry, eſtabliſhed by Mr. Colbert, at Paris, in 1667. See TAPESTRY.

GOBIO, a ſpecies of cyprinus, with the upper jaw longeſt, and two cirri at the mouth.

GOBIUS, in ichthyology, a genus of acanthopterygious fiſhes, with five ſmall bones in the membrane of the gills, and the belly-fins of which grow together into a funnel-ſhape.

To this genus belongs, 1. The ſea-gudgeon, or variegated gobius with fourteen rays in the hinder back-fin; it grows to eight inches in length, and is tolerably thick in proportion: it is very beautifully variegated with brown, white, yellow, green, blue, and black. See pl. CXXIII. fig. 1. n° 1. 2. The paganellus, or gobius with a yellow tranſverſe line on the top of the firſt back-fin: it grows to about ſix inches in length, and is tolerably thick in proportion. ibid. n° 2. 3. The jozo, or gobius with the ventral fin blue, and the rays of the back-fin aſſurgent. 4. The aphua, or aphya-cobites, or ſmall gobius with a great many rays in the ſecond back fin: its length is only an inch and half. *ibid.* n° 3.

GOBIUS is alſo a name uſed by different authors for ſeveral other diſtinct fiſhes. *viz.* 1. The cyprinus with the upper jaw longeſt, and two cirri at the mouth: this is the gobius fluviatilis. 2. The pearch with eight or nine black tranſverſe lines on each ſide. And, 3. The ſmooth cottus with two ſpines on the head. See the article CYPRINUS, PEARCH, &c.

GOBLET, a large drinking-cup of a round figure, without either foot or handle.

GOBONE', or GOBONY, in heraldry, the ſame with componed. See COMPONED.

GOD, *Deus*, the ſupreme being, the firſt cauſe or creator of the univerſe, and the only true object of religious worſhip.

The Hebrews called him Jehovah; which name they never pronounced, but uſed inſtead of it the words Adonai, or Elohim. See the articles ADONAI, ELOHIM, and JEHOVAH.

God, ſays ſir Iſaac Newton, is a relative term, and has reſpect to ſervants. It denotes, indeed, an eternal, infinite, abſolutely perfect being: but ſuch a being without dominion, would not be god. The word god frequently ſignifies lord, but every lord is not god. The dominion of a ſpiritual being, or lord, conſtitutes god; true dominion, true god; the ſupreme, ſupreme; pretended, pretended. From ſuch true dominion it follows that the true God is living, intelligent, and powerful; and from his other perfections, that he is ſupreme, or ſupremely perfect. He is eternal and infinite, omnipotent and omniſcient; that is, he endures from eternity to eternity, and is preſent from infinity to infinity. He governs all things that exiſt, and knows all things that are to be known. He is not eternity or infinity, but eternal and infinite. He is not duration and ſpace, but he endures and is preſent: he endures always, and is preſent every where; and by exiſting always and every where, conſtitutes the very things we call duration and ſpace, eternity and infinity. He is omnipreſent, not only virtually, but ſubſtantially; for power without ſubſtance cannot ſubſiſt. All things are contained and move in him, but without any mutual paſſion; that is, he ſuffers nothing from the motions of bodies, nor do they undergo any reſiſtance from his omnipreſence.

It is confeſſed, that God exiſts neceſſarily; and by the ſame neceſſity he exiſts always and every where. Hence alſo he muſt be perfectly ſimilar; all eye, all ear, all brain all arm, all perception, intelligence, and action; but after a manner not at all corporeal, not at all like men; after a manner altogether unknown to us. He is deſtitute of all body, and bodily ſhape, and therefore cannot be ſeen, heard, or touched; nor ought to be worſhipped under the repreſentation of any thing corporeal. We know him only by his properties, or attributes, by the moſt wiſe and excellent ſtructure of things, and by final cauſes: but we adore and worſhip him only on account of his dominion; for God, ſetting aſide dominion, providence, and final cauſes, is nothing elſe but fate and nature.

The plain argument, ſays Mr. Maclaurin, for the exiſtence of the deity, obvious to all, and carrying irreſiſtible conviction with it, is from the evident contrivance and fitneſs of things for one another, which we meet with throughout all parts of the univerſe. There is no need of nice or ſubtile reaſonings in this matter; a manifeſt contrivance immediately ſuggeſts a contriver. It ſtrikes us like a ſenſation; and artful reaſonings againſt it may puzzle us, but it is without ſhaking our belief. No perſon, for example, that knows the principles of optics and the ſtructure of the eye, can believe that it was formed without ſkill in that ſcience; or that the ear was formed without the knowledge of ſounds; or that the male and female in animals were not formed for each other, and for continuing the ſpecies. All our accounts of nature are full of inſtances of this kind. The admirable and beautiful ſtructure of things for final cauſes, exalt our idea of the contriver: the unity of deſign ſhews him to be one. The great motions in the ſyſtem, performed with the ſame facility as the leaſt, ſuggeſt his almighty power, which gave motion to the earth and the celeſtial bodies with equal eaſe as to the minuteſt particles. The ſubtilty of the motions and actions in the internal parts of bodies, ſhews that his influence penetrates the inmoſt receſſes of things, and that he is equally active and preſent every where. The ſimplicity of the laws that prevail in the world, the excellent diſpoſition of things, in order to obtain the beſt ends, and the beauty which adorns the works of nature, far ſuperior to any thing in art, ſuggeſt his conſummate wiſdom. The uſefulneſs of the whole ſcheme, ſo well contrived for the intelligent beings that enjoy it, with the internal diſpoſition, and moral ſtructure of thoſe beings themſelves, ſhew his unbounded goodneſs. Theſe are the arguments which are ſufficiently open to the views and capacities of the unlearned; while, at the ſame time they acquire new ſtrength and luſtre from the diſcoveries of the learned. The deity's acting and interpoſing in the univerſe, ſhew that he governs, as well as formed it; and the depth of his counſels, even in conducting the material univerſe, of which a great part ſurpaſſes our knowledge, keep up an inward veneration and awe of this great being, and diſpoſe us to receive what may be otherwiſe revealed to us, concerning him. It has been juſtly obſerved that ſome of the laws of nature now known to us, muſt have eſcaped us, if we had wanted the ſenſe of ſeeing. It may be in his power to beſtow upon us other ſenſes, of which we have at preſent no idea; without which it may be impoſſible for us to know all his works, or to have more adequate ideas of himſelf. In our preſent ſtate, we know enough to be ſatisfied of our dependency upon him, and of the duty we owe to him, the lord and diſpoſer of all things. He is not the object of ſenſe; his eſſence, and indeed that of all other ſubſtances, is beyond the reach of all our diſcoveries: but his attributes clearly appear in his admirable works. We know, that the higheſt conceptions we are able to form of them, are ſtill beneath his real perfections; but his power and dominion over us, and our duty towards him, are manifeſt.

Though God has given us no innate ideas of himſelf, ſays Mr. Locke, yet having furniſhed us with thoſe faculties our minds are endowed with, he hath not left himſelf without a witneſs; ſince we have ſenſe, perception, and reaſon, and cannot want a clear proof of him, as long as we carry ourſelves about us. To ſhew, therefore, that we are capable of knowing, that is, being certain that there is a God; and how we may come by this certainty, I think we need go no farther than ourſelves, and that undoubted knowledge we have of our own exiſtence. I think it is beyond queſtion, that man has a clear perception of his own being: he knows certainly that he exiſts, and that he is ſomething. In the next place, man knows, by an intuitive certainty, that bare nothing can no more produce any real being, than it can be equal to two right angles. If, therefore, we know there is ſome real being, it is an evident demonſtration, that from eternity there has been ſomething: ſince what was not from eternity, had a beginning; and what had a beginning, muſt be produced by ſomething elſe. Next it is evident, that what has its being from another, muſt alſo have all that which is in and belongs to its being from another too: all the powers it has, muſt be owing to, and received from the ſame ſource. This eternal ſource then of all beings, muſt be alſo the ſource and original of all power; and ſo this eternal being muſt be alſo the moſt powerful.

Again, man finds in himſelf perception and knowledge: we are certain then that there is not only ſome being, but ſome knowing intelligent being in the world. There was a time then, when there was no knowing being, or elſe there has been a knowing being from eternity. If it be ſaid, there was a time when that eternal being had no knowledge; I reply, that then it is impoſſible there ſhould have ever been any knowledge: it being as impoſſible that things wholly void of knowledge, and operating blindly, and without any perception, ſhould produce a knowing being, as it is impoſſible that a triangle ſhould make itſelf three angles bigger than two right ones. Thus, from the conſideration of ourſelves, and what we infallibly find in our own conſtitutions, our reaſon leads us to the knowledge of this certain and evident truth, that there is an eternal, moſt powerful, and knowing being, which whether any one will call God, it matters not. The thing is evident; and from this idea, duly conſidered, will eaſily be deduced all thoſe other attributes we ought to aſcribe to this eternal being. From what has been ſaid, it is plain to me, that we have a more certain knowledge of the exiſtence of a God, than of any thing our ſenſes have not immediately diſcovered to us. Nay, I preſume I may ſay, that we more certainly know that there is a God, than that there is any thing elſe without us. When I ſay, we know, I mean, there is ſuch a knowledge within our reach, which we cannot miſs, if we will but apply our minds to that, as we do to ſeveral other inquiries.

It being then unavoidable for all rational creatures to conclude, that ſomething has exiſted from eternity, let us next ſee what kind of a thing that muſt be. There are but two ſorts of beings in the world, that man knows or conceives; ſuch as are purely material, without ſenſe or perception; and ſenſible perceiving beings, ſuch as we find ourſelves to be. Theſe two ſorts we ſhall call cogitative and incogitative beings; which, to our preſent purpoſe, are better than material and immaterial.

If then there muſt be ſomething eternal, it is very obvious to reaſon, that it muſt neceſſarily be a cogitative being; becauſe it is as impoſſible to conceive that bare incogitative matter ſhould ever produce a thinking intelligent being, as that nothing of itſelf ſhould produce matter. Let us ſuppoſe any parcel of matter eternal, we ſhall find it in itſelf unable to produce any thing. Let us ſuppoſe its parts firmly at reſt together; if there were no other being in the world, muſt it not eternally remain ſo, a dead unactive lump? is it poſſible to conceive that it can add motion to itſelf, or produce any thing? Matter then, by its own ſtrength, cannot produce in itſelf ſo much as motion. The motion it has, muſt alſo be from eternity, or elſe added to matter by ſome other being, more powerful than matter. But let us ſuppoſe motion eternal too; but yet matter, incogitative matter, and motion could never produce thought. Knowledge will ſtill be as far beyond the power of nothing to produce. Divide matter into as minute parts as you will, vary its figure and motion as much as you pleaſe, it will operate no otherwiſe upon other bodies, of proportionable bulk, than it did before this diviſion. The minuteſt particles of matter, knock, repel, and reſiſt one another, juſt as the greater do, and that is all they can do: ſo that if we ſuppoſe nothing eternal, matter can never begin to be: if we ſuppoſe bare matter without motion eternal, motion can never begin to be: if we ſuppoſe only matter and motion eternal, thought can never begin to be: for it is impoſſible to conceive, that matter, either with or without motion, could have originally in and from itſelf, ſenſe, perception, and knowledge, as is evident from hence, that then ſenſe, perception, and knowledge muſt be a property eternally inſeparable from matter, and every particle of it. Since, therefore, whatſoever is the firſt eternal being, muſt neceſſarily be cogitative; and whatſoever is firſt of all things muſt neceſſarily contain in it, and actually have at leaſt all the perfections that can ever after exiſt; it neceſſarily follows, that the firſt eternal being cannot be matter. If, therefore, it be evident, that ſomething muſt neceſſarily exiſt from eternity, it is alſo as evident, that that ſomething muſt be a cogitative being. For it is as impoſſible that incogitative matter ſhould produce a cogitative being, as that nothing, or the negation of all being, ſhould produce a poſitive being, or matter.

This diſcovery of the neceſſary exiſtence of an eternal mind, ſufficiently leads us to the knowledge of God: for it will hence follow, that all other knowing beings that have a beginning, muſt depend on him, and have no other ways of knowledge or extent of power, than what he gives them; and therefore if he made thoſe, he made alſo the leſs excellent pieces of this univerſe, all inanimate bodies, whereby his omniſcience, power, and providence will be eſtabliſhed; and from thence all his other attributes neceſſarily follow.

With reſpect to chriſtians, it need only be juſt mentioned, that they were very early divided in opinion, as to the nature and eſſence of the ſupreme Being; a great part worſhipping three perſons in the unity of the godhead, whilſt others abſolutely rejected a trinity of perſons, and aſſerted the unity of the divine nature, both as to perſon and ſubſtance. See the articles ARIANS and TRINITARIANS.

With reſpect to the theology of the pagans, it is thought by moſt learned men, that they acknowledged but one God; and that the many different divinities worſhiped by them, were but attributes and actions of one and the ſame God. This may probably be true of the wiſer heathens; and indeed there are many ſtrong and beautiful paſſages in pagan authors, to prove that theſe acknowledged but one God. Thus Pythagoras taught the unity of God, and defined him to be a mind penetrating and diffuſing itſelf through all the parts of the univerſe, from which all animals receive life: and Plato called God the being which is; and whenever he mentions the deity, it is always in the ſingular number.

It is a celebrated diviſion of the heathen gods into *dii majorum gentium*, and *dii minorum gentium*; that is, into the ſuperior and inferior gods. Another diviſion was taken from their place of reſidence; thus there were celeſtial, terreſtrial, infernal, marine, and ſylvan gods. They were alſo divided into animal and natural gods: the animal gods were mortals, who had been raiſed to divinity by ignorance and ſuperſtition (ſee APOTHEOSIS); and the natural gods, the parts of nature, ſuch as the ſtars, the elements, mountains, rivers, *&c.* There were alſo deities, who were ſuppoſed to preſide over particular perſons: ſome had the care of women in child-birth; others, the care of children and young perſons; and others were the deities of marriage. Each action, virtue, and profeſſion had alſo its particular god: the ſhepherds had their Pan; the gardeners, their Flora; the learned, their Mercury and Minerva; and the poets, their Apollo and the Muſes. See the articles GENIUS, LARES, PENATES, *&c.*

GODALMIN, a market town of Surry, thirty miles ſouth-weſt of London.

GOD-BOTE, an eccleſiaſtical fine impoſed for offences againſt God.

GODDESS, a heathen deity of the female ſex.

The antients had almoſt as many goddeſſes, as gods; ſuch were Juno, the goddeſs of air; Diana, the goddeſs of woods, *&c.* and under this character were repreſented the virtues, graces, and principal advantages of life, Truth, Juſtice, Piety, Liberty, Fortune, Victory, *&c.*

It was the peculiar privilege of the goddeſſes to be repreſented naked on medals; for it was ſuppoſed that the imagination muſt be awed and reſtrained by the conſideration of the divine character.

GOD-FATHERS, and GOD-MOTHERS, perſons who at the baptiſm of infants, anſwer for their future conduct, and ſolemnly promiſe that they will renounce the devil and all his works, and follow a life of piety and virtue, and by this means lay themſelves under an indiſpenſable obligation to inſtruct them, and watch over their conduct. See SPONSORS.

This cuſtom is of great antiquity in the chriſtian church, and was probably inſtituted to prevent children being brought up in idolatry, in caſe their parents died before they arrived at years of diſcretion.

The number of god-fathers and god-mothers is reduced to two, in the church of Rome; and three, in the church of England: but formerly they had as many as they pleaſed.

GODWIT, *totanus*, in ornithology. See TOTANUS.

GOES, a port-town of Zeland, in Holland, ten miles eaſt of Middleburgh.

GOGMAGOG-HILLS lie three miles ſouth-eaſt of Cambridge: remarkable for the intrenchments caſt up on them.

GOLCONDA, the capital of a province of the ſame name, in the hither India: eaſt long. 77°, and north lat. 16°.

GOLD, *aurum*, a yellow metal, the heavieſt, pureſt, moſt ductile, and ſhining, and on theſe accounts the moſt valuable of all metals. See the article METAL.

Gold is the moſt frequently found native of all the metals; and is indeed very rarely found in a ſtate of ore, that is, diveſted of its metallic form, by its particles being penetrated by, and intimately mixed with ſulphur: and in the few inſtances in which it is found thus, it never conſtitutes a peculiar ore, but is found intermixed among the ores of other metals; and moſt frequently among thoſe of ſilver, or thoſe in which, though ſome other be the predominant metal, there is a large quantity of ſilver in which the gold lies in its ſtate of ore. See the article ORE.

Native gold, though free from the penetrating ſulphurs which reduce metals to ores, is yet very ſeldom found pure, but has almoſt conſtantly an admixture of ſilver with it, and very frequently of copper: when it has copper in it, it is eaſily diſcovered, if in any conſiderable quantity,

tity, by its hardneſs: the ſilver is not ſo eaſily detected in it. Native gold is ſometimes found in pure maſſes of conſiderable ſize, many having been found of more than a pound weight: theſe maſſes are met with in the gold mines, and are called aurum obryzum, or obryzium, but they are very rare: ſuch, however, have been ſometimes found in the german mines. See the article MINE.

Its more common appearance, in its more looſe ſtate, is in form of what is called gold-duſt: this is native gold in ſmaller maſſes, uſually indeed very ſmall, mixed among the ſands of rivers. This is found in many parts of the world, but the greateſt quantity of it is from Guinea: ſome of it is to be met with in the beds of ſome of the rivers in Scotland. Native gold, in a middle ſtate as to ſize between theſe two kinds, is alſo found in the clifts or perpendicular fiſſures of the ſolid ſtrata in the mountains of Chili. Theſe fiſſures are filled up partly with reddiſh marle, partly with native gold immerſed in a debaſed cryſtalline ſtone, of a bluiſh hue; and partly with looſe native gold, which is uſually found in flat pieces, from the ſize of a pea to that of a horſe-bean: the quantity however, ſo far as has been yet diſcovered, is not great.

Theſe, though not unfrequent in thoſe parts of the world where there is gold, are, however, far from being its moſt common appearance; for it is generally and in the greateſt abundance found bedded in maſſes of hard ſtone, which lie at vaſt depths; being often dug at a hundred and fifty fathoms: there is no peculiar ſtone in which the gold is found in thoſe places, but it is met with indiſcriminately in ſeveral kinds; ſome ſoft, ſome harder, and even in earths. The richeſt maſſes are uſually of a whitiſh, and ſomewhat bright, but opake ſtone, which is a debaſed cryſtal, containing a large quantity of a white earth: this is often tinged in part alſo with black, and ſometimes with other colours: yet thro' all the different ſtains the nature and texture of the ſtone may be eaſily diſcovered to be the ſame; and often the whole variety of colours will be found in one maſs. In this ſtone, the gold lies in a very beautiful form, and a great variety of figures; ſome parcels of it are variouſly divaricated, or in form of ſmall branched figures, but theſe are very rare. Others are variouſly interwoven in narrower, or broader veins; and others in ſmall flat ſpangles, intermixed with ſpecks of black: the ſtone in which this is lodged will very readily give fire with ſteel, and will not at all ferment with aqua fortis.

Beſides this, however, there are many other ſtones in the mines of Peru, which hold conſiderable quantities of gold, viſible in large or ſmaller ſpecks; and theſe are of all colours, but uſually white or reddiſh: the gold in theſe is uſually in ſmall ſpangles, but there is no certainty either in the ſize of the maſſes of pure native gold in this, or any other ſtate; that of the coaſts of Guinea, uſually called gold-duſt, and commonly finer than the ſmaller ſands, yet ſometimes affords pieces of three or four ounces weight; and the lumps of aurum obryzum, as it is called, have been found between twenty and thirty pound weight: theſe things, however, are not common.

Properties of GOLD. The chemiſts tell us, that gold is compoſed of two ſubſtances; the one an extremely pure and ſimple matter, of the nature of mercury, and the other, which, they ſay, fixes or deſtroys the fluidity of this, an equally pure and ſimple ſubſtance, extremely ſubtile, and of the nature of ſulphur. We are not, ſays Dr. Hill, to take all this upon the credit of thoſe who affirm it; for by all the trials that have been made, gold ſeems the moſt ſimple of all ſubſtances. It is the heavieſt of all known bodies; and it is the moſt ductile of all the metals. See the articles GRAVITY and DUCTILITY.

It is wholly incapable of ruſt, and is not ſonorous when ſtruck upon. It requires a ſtrong fire to melt it, remaining unaltered in the degree of heat that fuſes tin or lead, but running with a leſs vehement one than is neceſſary to the fuſing of iron, or copper. It does not retain its colour, till the time of its melting, but becomes ignited and white, before it runs, and when in fuſion it appears of a pale, bluiſh, green colour on the ſurface. It amalgamates the moſt readily of all the metals with quickſilver. When in a ſtate of fuſion, it very eaſily, and very intimately blends itſelf with ſilver, and when mixt with that metal, will alſo run into a maſs with iron. Either ſilver or gold may indeed be mixed ſingly with this metal, by fuſion, but it is much more eaſily done with regard to gold, when before blended with ſilver. It much more eaſily mixes with copper, and the other metals; and very readily with ſome of the ſemimetals; as with the regulus of antimony: common fire carried to its utmoſt vehemence, has no further effect on gold than the fuſing it. It will remain ever ſo long in its fierceſt heat, and come out at laſt unaltered, and with its whole weight. Expoſed to the focus of the ſtrongeſt burning-glaſſes, it ſparkles and flies off in ſmall maſſes, which if recovered on paper, and examined afterwards, are found to be pure unaltered gold; but if the heat be managed very nicely, and the ſame gold again and again expoſed to it, it is affirmed that a part of the gold will at length go off in fumes, and the remainder will be found to be a ſubſtance of a deep blue, with ſome admixture of purple; and approaching to the nature of vitriol, rather than of gold, of which it wants the malleability, and the ſpecific gravity.

The proper ſolvent of gold is aqua regia: this menſtruum owes its power upon this metal to the ſea ſalt it contains; that being almoſt the only ſalt which has the quality of acting upon gold. The effect of this menſtruum affords us one teſt for this metal; if we require another, we may have recourſe to a fuſion with antimony: for if pure gold and antimony be blended together, the antimony upon keeping up the fire to a great height will be driven off in fumes, and will leave the gold, if pure, unaltered in weight; whereas, if it contained any mixture of another metal, the antimony would have taken it away with it, not excepting even ſilver itſelf. See the articles AQUA REGIA and ANTIMONY.

If a quantity of ſalt of tartar, or any other fixed alkali, be thrown into a ſolution of gold, the metal is precipitated in form of a powder, which has an exploſive power greater than that of gunpowder, or the pulvis fulminans of the chemiſts. This powder, from its property, is called aurum fulminans. See the article AURUM.

Gold is greatly the moſt diviſible of all bodies. If melted with a hundred thouſand times its weight of ſilver, it will perfectly and equally blend itſelf with that metal: any grain of the melted maſs being cut off, will be found on aſſaying, to contain its due and proportionate quantity of the gold in it; and a ſingle drop of a ſolution of gold in aqua regia, will communicate a metalline taſte to a pint of ſpirit of wine, if mixed with it.

It is to be obſerved, that aqua regia, tho' the general and common ſolvent of gold, is not the only one. Hunkel long ſince diſcovered, that it might be diſſolved by the fumes ariſing from a mixture of oil of tartar, and oil of vitriol; and a menſtruum in the common liquid form, may be produced from theſe which will have the ſame power. Mercury alſo is a true ſolvent of this metal by amalgamation; and the hepar ſulphuris, or liver of ſulphur, on being fuſed with it, takes it up ſo perfectly, that it will be carried into a lac ſulphuris, either in the ſolution or precipitation. See AMALGAMATION.

The chemical character to expreſs gold is a circle with a point in the center thus, ⊙. They intend this as a ſymbol of perfection and ſimplicity: the circle being the moſt uniform of all figures; and comprehending the greateſt ſpace under the ſmalleſt ſuperficies. See the article CHARACTER.

Numberleſs have been the attempts to convert other metals into gold; but as nothing is ſo hard to communicate by art as gravity, they are hitherto, and are likely always to be without ſucceſs. See the article PHILOSOPHER'S STONE.

The degradation of gold ſeems as highly difficult as the making it: ſome induſtrious people have gone ſo far towards this, as to bring gold to a ſtate in which no reducing fluxes they were acquainted with, could reſtore it again: but this is no proof that others might not have been invented that would have done it. The vapour of phoſphorus, indeed, in a manner calcines gold into a ſort of unmalleable matter of the appearance of a calx; and the ſame thing may be done by a long and gentle calcination of gold, that has been amalgamated with mercury: but people are able to reduce gold in this ſtate, produced by either means, into pure malleable gold again.

Method of imitating GOLD. Dr. Shaw thinks the following method of Mr. Homberg, for treating copper with quickſilver, preferable in imitating gold for the making watches, buckles, cane-heads, ſnuff-boxes, *&c.* to any other.

If an amalgam be boiled in river-water for two hours; and then the quickſilver be diſtilled off, and cohobated once; then the remaining copper, being now fuſed, will be of a beautiful gold colour, and more ductile than copper, ſo as to become well fitted for watchwork, gilding, and the finer machines and utenſils. See the article AMALGAM.

For the methods of ſeparating and refining GOLD, ſee the articles ASSAYING, COPPELLING, CEMENTATION, DEPART, REFINING, ORE, and WASHING.

GOLD, in medicine. The virtues of gold in medicine, however highly extolled by ſome writers, ſeem altogether imaginary. The Greeks never paid much reſpect to it in this way. Geoffroy tells us, that they never uſed it in medicine at all; but he ſeems miſtaken, for Dioſcorides preſcribes the filings of this metal to thoſe who had ſwallowed mercury. It firſt got footing as a medicine among the Arabians, and we find them preſcribing it to be beat into thin leaves as an ingredient in many of their compoſitions. They tell us, that it is a cordial, and that it has great virtues againſt palpitations of the heart, nervous complaints, and melancholy. The chymiſts go farther, and talk of aurum potabile as an univerſal medicine: but there ſeems no great credit to be given to any thing that has been ſaid upon this head; and the preſent practice allows its uſe as an ornament only to medicines, not as a medicine itſelf: the only preparation of it that has been received on the footing of a medicine by rational people, is the aurum fulminans, and that has been of late proved to be a very miſchievous one. For this, and the other preparations of gold, ſee the article AURUM.

GOLD-WIRE, a cylindrical ingot of ſilver, ſuperficially gilt, or covered with gold at the fire, and afterwards drawn ſucceſſively through a great number of little, round holes, of a wire-drawing iron, each leſs than the other, till it be ſometimes no bigger than a hair of the head. See the article WIRE.

It may be obſerved, that before the wire be reduced to this exceſſive fineneſs, it is drawn through above an hundred and forty different holes, and that each time they draw it, it is rubbed afreſh over with new wax, both to facilitate its paſſage, and to prevent the ſilver's appearing through it.

GOLD-WIRE *flatted*, is the former wire flatted between two rollers of poliſhed ſteel, to fit it to be ſpun on a ſtick, or to be uſed flat, as it is without ſpinning, in certain ſtuffs, laces, embroideries, *&c.*

GOLD THREAD, or SPUN GOLD, is a flatted gold, wrapped or laid over a thread of ſilk, by twiſting it with a wheel and iron bobins.

Manner of forming GOLD-WIRE, *and* GOLD THREAD, *both round and flat.* Firſt, an ingot of ſilver, of twenty-four pounds, is forged into a cylinder, of about an inch in diameter: then it is drawn thro' eight or ten holes, of a large, coarſe wire-drawing iron, both to finiſh the roundneſs and to reduce it to about three-fourths of its former diameter. This done they file it very carefully all over to take off any filth remaining on the forge; then they cut it in the middle; and thus make two equal ingots thereof, each about twenty-ſix inches long, which they draw through ſeveral new holes, to take off any inequalities the file may have left, and to render it as ſmooth and equable as poſſible.

The ingot thus far prepared, they heat it in a charcoal fire; then taking ſome gold leaves, each about four inches ſquare, and weighing twelve grains, they join four, eight, twelve, or ſixteen of theſe as the wire is intended to be more or leſs gilt; and when they are ſo joined, as only to form a ſingle leaf, they rub the ingots reeking hot with a burniſher. Theſe leaves being thus prepared, they apply over the whole ſurface of the ingot, to the number of ſix, over each other, burniſhing or rubbing them well down with the blood-ſtone, to cloſe and ſmoothe them. When gilt, the ingots are laid anew in a coal fire; and when raiſed to a certain degree of heat, they go over them a ſecond time with the blood-ſtone, both to ſolder the gold more perfectly, and to finiſh the poliſhing: The gilding finiſhed, it remains to draw the ingot into wire.

In order to this, they paſs it through twenty holes of a moderate drawing iron, by which it is brought to the thickneſs of the tag of a lace: from this time the ingot loſes its name, and commences gold wire. Twenty holes more of a leſſer iron leaves it ſmall enough for the leaſt iron; the fineſt holes, of which laſt ſcarce exceeding the hair of the head, finiſh the work.

To diſpoſe the wire to be ſpun on ſilk, they paſs it between two rollers of a little mill: theſe rollers are of nicely poliſhed ſteel, and about three inches in diameter. They are ſet very cloſe to each other, and turned by means of a handle faſtened to one of them, which gives motion to the other. The gold wire in paſſing between the two, is rendered quite flat, but without loſing any thing of its gilding, and is rendered ſo exceedingly thin and flexible, that it is eaſily ſpun on ſilk thread, by means of a hand wheel, and ſo wound on a ſpool or bobin.

GOLD-LEAF, or **BEATEN GOLD**, is gold beaten with a hammer into exceeding thin leaves, ſo that it is computed, that an ounce may be beaten into ſixteen hundred leaves, each three inches ſquare, in which ſtate it takes up more than 159052 times its former ſurface. See the article DUCTILITY.

This gold they beat on a block of black marble, about a foot ſquare, and uſually raiſed three feet high: they make uſe of three ſorts of hammers, formed like mallets, of poliſhed iron: the firſt, which weighs three or four pounds, ſerves to chaſe, or drive; the ſecond, of eleven or twelve pounds, to cloſe; and the third, which weighs fourteen or fifteen pounds, to ſtretch and finiſh. They alſo make uſe of four moulds of different ſizes, *viz.* two of vellom, the ſmalleſt whereof conſiſts of forty or fifty leaves, and the larger of two hundred: the other two, conſiſting each of five hundred leaves, are made of bullocks guts well ſcoured, and prepared. See the article MOULD.

Method of preparing and beating GOLD. They firſt melt a quantity of pure gold, and form it into an ingot: this they reduce, by forging, into a plate about the thickneſs of a ſheet of paper; which done, they cut the plate into little pieces about an inch ſquare, and lay them in the firſt or ſmalleſt mould to begin to ſtretch them: after they have been hammered here a while with the ſmalleſt hammer, they cut each of them into four, and put them into the ſecond mould, to be extended further.

Upon taking them hence, they cut them again into four, and put them into the third mould, out of which they are taken, divided into four, as before, and laid in the laſt, or finiſhing mould, where they are beaten to the degree of thinneſs required.

The leaves thus finiſhed, they take them out of the mould, and diſpoſe them into little paper books, prepared with a little red bole for the gold to ſtick to; each book ordinarily contains twenty-five gold leaves. There are two ſizes of theſe books; twenty-five leaves of the ſmalleſt only weigh five or ſix grains, and the ſame number of the largeſt, nine or ten grains.

It muſt be obſerved, that gold is beaten more or leſs, according to the kind or quality of the work it is intended for; that for the gold wire-drawers to gild their ingots withal, is left much thicker than that of gilding the frames of pictures, &c. withal. See GILDING.

GOLD-FINCH, in ornithology, the engliſh name of a ſpecies of fringilla, with the wings variegated with black, yellow, and white. See the article FRINGILLA.

The common gold-finch is a very elegantly coloured bird, ſomewhat ſmaller than the common ſparrow. But beſides this, there are ſeveral other ſpecies, as the Greenland gold-finch, with a black ſpotted head, about the ſize of the common linnet; and the greeniſh yellow gold-finch, nearly of the ſize repreſented in plate CXIX. fig. 1.

This laſt is a moſt elegant bird; the fore-part of its head, and the upper part of the throat being covered with fine ſcarlet-coloured feathers, the top of the head aſh-coloured, and the upper part of the body a yellowiſh green.

GOLD-COIN. See the article COIN.

Waſhing of **GOLD-ORE.** See the article WASHING *of Ore.*

GOLD-SIZE. See the article SIZE.

GOLD-SMITH, or as ſome chooſe to expreſs it, *ſilver-ſmith*, an artiſt who makes veſſels, utenſils, and ornaments in gold and ſilver.

The goldſmith's work is either performed in the mould, or beat out with the hammer, or other engine. All works that have raiſed figures, are caſt in a mould, and afterwards poliſhed and finiſhed: plates, or diſhes, of ſilver or gold, are beat out from thin flat plates; and tankards, and other veſſels of that kind, are formed of plates ſoldered together, and their mouldings are beat, not caſt. The buſineſs of the goldſmiths formerly required much more labour than it does at preſent; for they were obliged to hammer the metal from the ingot to the thinneſs they wanted: but there are now invented flatting-mills, which reduce metals to the thinneſs that is required, at a very ſmall expence. The goldſmith is to make his own moulds, and for that reaſon ought to be a good deſigner, and have a taſte in ſculpture: he alſo ought to know enough of metallurgy, to be able to aſſay mixed metals, and to mix the alloy.

The goldſmiths in London employ ſeveral hands under them for the various articles of their trade: ſuch are the jeweller, the ſnuff-box and toy-maker, the ſilver turner, the gilder, the burniſher, the chaſer, the refiner, and the gold-beater.

Goldſmiths are ſuperior tradeſmen: their wares muſt be aſſayed by the wardens of the company of this name in London, and marked: and gold is to be of a certain touch. No goldſmith may take above one ſhilling the ounce of gold, beſides what he has for the faſhioning, more than the buyer may be allowed for it at the king's exchange; and here any falſe metal ſhall be ſeized and forfeited to the king. The cities of York, Exeter, Briſtol, &c. are places appointed for the aſſaying wrought-plate of goldſmiths; alſo a duty is granted on ſilver-plate of ſix-pence an ounce, &c. Plate made by goldſmiths, ſhall be of a particular fineneſs, on pain of forfeiting 10 l. and if any parcel of plate ſent to the aſſayers is diſcovered to be of a coarſer alloy than the reſpective ſtandards, it may be broke, and defaced; and the fees for aſſaying are particularly limited.

Burniſhed **GOLD**, that ſmoothed or poliſhed with a burniſher. See the articles BURNISHER, and BURNISHING.

Moſaic **GOLD**, that applied in pannels, on proper ground, diſtributed into ſquares, lozenges, and other compartments, part whereof is ſhadowed to heighten, or raiſe the reſt. See the article MOSAIC.

Shell-**GOLD**, that uſed by the illuminers, and wherewithal we write gold letters. It is made of the pareings of leaf-gold, and even of the leaves themſelves, reduced into an impalpable powder, by grinding on a marble with honey. After leaving it to infuſe ſome time in aqua fortis, they put it in ſhells, where it ſticks. To uſe it they dilute it with gum-water, or ſoap-water.

Pure **GOLD**, that purged by fire of all its impurities, and all alloy. See ALLOY. The moderns frequently call it gold of twenty-four caracts, but in reality there is no ſuch thing as gold ſo very pure, and there is always wanting at leaſt a quarter of a caract. Gold of twenty-two caracts, has one part of ſilver, and another of copper; that of twenty-three caracts has half a part, *i. e.* half a twenty-fourth of each. See CARACT.

Standard value of **GOLD** *coin.* See COIN.

GOLD, in heraldry, is one of the metals, more uſually called by the french name *or*. See the articles METAL and OR.

Laws relating to **GOLD** *manufactures.* Gold and ſilver beaten, wrought in papers, for the printers, are prohibited to be imported by 1 Richard III. Gold and ſilver thread, lace, fringe, or other works made thereof, are prohibited to be imported by the 10th of Anne. Upon oath, that the goods were actually made after the firſt of July, 1712, of plate, wire-ſpun upon ſilk, and ſecurity given that they ſhall not be relanded in Great-Britain, &c. the exporter of gold lace, thread, and fringe, is to have the following allowance, *viz.* gold lace, thread, or fringe, the pound weight averdupois, 6 s. 8 d.

GOLDEN, ſomething that has a relation to gold, or conſiſts of gold, is valuable, or the like; as,

GOLDEN-BULL. See the article BULL.

GOLDEN-CALF, in jewiſh antiquity, a figure which the Iſraelites caſt in gold, and ſet up in the wilderneſs to worſhip during Moſes's abſence in the mount, and which that legiſlator, at his return, burnt, ground to powder, and mixed with the water the people were to drink of; as in Exod. xxxii.

GOLDEN-EYE, in ornithology, *Clangula.* See the article CLANGULA.

GOLDEN-FLEECE, in the antient mythology, the ſkin, or fleece, of the ram upon which Phryxus and Hella are ſuppoſed to have ſwam over the ſea to Colchis; which being ſacrificed to Jupiter, its fleece was hung upon a tree in the grove of Mars, guarded by two brazen-hoofed bulls, and a monſtrous dragon that never ſlept; but was at laſt taken and carried off by Jaſon, and the Argonauts.

Order of the **GOLDEN-FLEECE.** See the article FLEECE.

GOLDEN-NUMBER, in chronology, a number ſhewing what year of the moon's cycle any given year is. See CYCLE.

From what has been ſaid under cycle of the moon, it appears that the golden number will not ſhew the true change of the moon for more than three hundred and twelve years, without being varied. It is to be obſerved, that the golden number is not ſo well adapted to the Gregorian as to the Julian calendar; the epact being more certain in the new ſtyle, to find which, the golden number is of uſe. See the article EPACT.

The rule for finding the golden number

is already given under CYCLE *of the moon*, or *lunar* CYCLE, of which rule take this example for the year 1754

Add 1
19)1755(92
171
45
38
7 Golden N°.

GOLDEN-ROD, *ſolidago*, in botany. See the article SOLIDAGO.

GOLDEN-ROSE. The pope annually conſecrates a golden-roſe on the fourth Sunday in Lent, which is ſent to princeſſes, or to ſome church, as a mark of his peculiar affection.

GOLDEN-RULE, in arithmetic, is alſo called the rule of three, and the rule of proportion. See PROPORTION, and RULE OF THREE.

GOLDINGEN, a city of Poland, in the dutchy of Courland, ſixty miles weſt of Mittau: eaſt long. 22°, and north lat. 57°.

GOLNAW, a city of Brandenburg-Pomerania, fifteen miles north-eaſt of Stetin; eaſt long. 15°, north lat. 53° 40′.

GOLPS, in heraldry, are roundles of a purple tincture, called by the French torteaux, adding their peculiar colours.

GOLTBERG-EARTH, *goltbergenſis terra*, a ſpecies of bole. See BOLE.

GOMBRON, the greateſt ſea-port town in Perſia, ſituated on the ſtrait at the entrance of the gulph of Perſia, oppoſite to the iſland of Ormus: eaſt long. 55° 30′, north lat. 27° 30′.

GOMERA, one of the Canary-Iſlands, ſubject to Spain, and ſituated weſt of Teneriff: weſt long. 18°, north lat. 28°.

GOMORRAH-ISLANDS, ſituated between 10° and 13° ſouth lat. on the eaſtern coaſt of Africa.

GOMPHOSIS, γομφωσις, in anatomy, a ſpecies of articulation, wherein one bone is ſet in the other, like a nail or peg; as the teeth within the jaws. See the article ARTICULATION.

GOMPHRENA, the PURPLE EVERLASTING FLOWER, in botany, a genus of the pentandria-digynia claſs of plants, the flower of which is divided into five parts, and erect: the petals are ſubulated and permanent: the fruit is a thin, roundiſh cruſt, with one cell, in which are contained a ſingle, large, roundiſh ſeed, with an oblique end. It is a native of both Eaſt and Weſt-Indies; and the flower is uſually of a beautiful purple colour.

GONAGRA, among phyſicians, ſignifies the gout in the knee. See GOUT.

GONARCHA, in antiquity, a dial delineated on ſeveral ſurfaces, or planes, ſome horizontal, others erect, oblique, &c. See the article DIAL.

GONDOLA, in naval architecture, a flat kind of boat, very long and narrow, chiefly uſed on the canals at Venice.

GONDOLA-SHELL, in natural hiſtory, a ſpecies of dolium, with an extremely wide mouth. See DOLIUM.

GONFANON, or GONFALON, a kind of banner, carried in the proceſſions of the principal churches at Rome.

GONGER, in ichthyology, the ſame with conger. See the article CONGER.

GONORRHOEA, in medicine, an involuntary efflux of the ſeminal juices, and ſome other recrementitious matter.

Authors take notice of three ſpecies of gonorrhœas; the firſt is a ſimple gonorrhœa, or perpetual efflux of the ſeminal juices, without any virulence: the ſecond is a venereal, or virulent gonorrhœa, ſo called, though improperly, from its ſimilitude to the preceding: the third is an involuntary efflux of a viſcid white, or whitiſh fluid from the urethra, in conſequence of a venereal gonorrhœa ill cured, or too frequently repeated.

The firſt ſpecies of this diſorder ariſes from a want of a due tone in the ſolid parts, and by a preternatural relaxation of the veſſels containing the ſeed, and of the parts adjacent to them. See GLEET.

This gonorrhœa is either mild or benign, or of a malignant kind. The latter conſiſts in a diſcharge of matter of various colours, accompanied with heat and exulceration; and in ſcorbutic, or cacochymic patients, as alſo thoſe afflicted with the ſtone, this diſorder is generally attended with a pain in diſcharging the urine, which in ſuch patients, is of an acrimonious quality: but in a gonorrhœa of a mild or a benign kind, a whitiſh liquor all of one colour, is diſcharged without pain, heat, or exulceration; and frequently proceeds from a redundance of the ſeminal fluid, ariſing from high living in an unmarried ſtate, or its acrimony in cacochymic, ſcorbutic, or arthritic patients, as well as from the weakneſs of, and want of due tone in the ſeminal veſſels.

The cure of a benign gonorrhœa is highly difficult; nor can any other reaſon be aſſigned for this diſorder, than that there is a preternatural efflux of impure humours from all parts of the body to thoſe parts infected, which are already too much weakened, and have their tone deſtroyed. Beſides, the parts ſubſervient to generation, which are in this diſorder affected, conſiſt entirely of nerves and nervous coats; and it is not without the greateſt difficulty that the energy of medicines penetrates to them. In the cure, the following intentions are to be purſued. Firſt, the redundance of impure ſerum, if there are any ſuch in the body, is, by means of proper laxatives, to be evacuated and derived from the parts affected. Then the too much relaxed and flaccid parts are to be ſtrengthened by proper corroborating medicines, both of the external and internal kind. The former of theſe intentions is anſwered by ſuch laxatives as operate in a double manner, ſuch as the pilulæ balſamicæ of Becher, which are not only purgative, but highly corroborating. To anſwer the other intention, the following powder muſt be uſed. Take of cuttle bone one ounce; of red coral, amber, the ſpecies of hyacinth, and the bark of caſcarilla, each two drams; make into a powder, one dram of which is to be taken every morning and evening in a decoction of barley, prepared with ſome almonds. At the ſame time the following epithem may be applied to the region of the pubes and perinæum, eſpecially during the night-time. Take of herbs, baum, mint, and baſil; of the leaves of red roſes, and baluſtins, each one handful; of pomgranate-bark, cloves, nutmegs, cardamoms, and maſtich, each half an ounce: mix together, and put into a ſmall bag to be boiled in red French wine. Theſe meaſures are to be ſeconded by an accurate regimen, being chiefly ſuch as is preſcribed below for the virulent gonorrhœa.

In the cure of a malignant gonorrhœa, regard is to be had to the conſtitution of the patient: when he is hot, and of a delicate conſtitution, he ought, eſpecially in the beginning of the diſtemper, to abſtain from hot ſubſtances, purgatives, ſudorifics, diuretics, &c. The following preparation may be frequently exhibited in this diſorder. Take of mint, three handfuls; of venice turpentine, one ounce; of peruvian balſam, half an ounce; diſtil with three pints of rheniſh wine. The doſe is from one to two ounces: and the following may be uſed as a ſuccedaneum. Take of roſe-water, and rectified ſpirit of wine, each half a pint; and of the balſam of life, fifty drops. Mix all together.

A virulent gonorrhœa, or clap, being the ſecond ſpecies of this diſorder, proceeds from impure coition with an infected perſon.

This diſtemper begins, and makes its progreſs in the following manner.

The patient, ſooner or later, according as the perſon with whom he has had converſation, was more or leſs infected, and according to his conſtitution, by which he may be more or leſs diſpoſed to receive the infection, is firſt ſeized with an unuſual pain in the genitals; and a kind of ſenſation like a rotation of his teſticles. Afterwards, if the prepuce conſtantly covers his glans, there appears an eruption, or puſtule, which, by its ſize, colour and figure, reſembles a ſpot of the meaſles. Preſently after appears a weeping matter like ſemen, which daily changes colour, and becomes more purulent, and more yellow, till, at length, if the diſorder be highly virulent, it aſſumes a greeniſh hue, or appears like a thin ſanious matter, mixt with blood. The puſtule at length becomes an ulcer, called a ſhanker. See SHANKER.

Thoſe whoſe glans is uncovered, ſeldom have ſuch a puſtule, and are leſs liable to imbibe the infection. The running brings on a heat, or ſmarting in making water, which is moſt violent, when it is over, for then it ſeems to burn the whole duct of the urethra.

Another ſymptom is the cordee, or contraction of the frænum, by which the penis is bent downwards. There is likewiſe, when the penis is erected, great pain, as if compreſſed tranſverſely with a ſtrong hand. This chiefly happens in the night, when the patient is warm in bed: ſometimes the urethra being eaten, and excoriated with long running of acrimonious pus, nature breeds a ſoft ſpungy fleſh, to ſupply the defect, which daily increaſing, forms caruncles, or carnoſities ſo far as to plug up the urinary paſſage, and ſtop up the urine. However, the little adjoining ulcers continue to pour forth a kind of an ichor. It alſo happens, through ſome violent motion, or the ill-timed uſe of aſtringents, that the ſanies, which ſhould be carried off by the gonorrhœa, is tranſlated to the ſcrotum, and cauſes one or both of the teſticles to ſwell, and inflame with intolerable pain: the running at the ſame time decreaſing, while the ſcalding of the urine is as great as ever.

To theſe ſymptoms may be added the phimoſis, and the paraphimoſis. There are alſo ſometimes watery bladders, called cryſtallines, and at length buboes of the glands in the groin. See PHIMOSIS, PARAPHIMOSIS, BUBO, and POX.

Women are not ſo ſubject to ſuch a variety of ſymptoms as men: their chief complaint being a difficulty of urine, and a running; however they are liable to ſhankers and venereal warts, as well within as on the outward parts of the labia pudendi; as alſo to buboes in the groin: as for the coarctation of the ſphincter vaginæ, purſing as it were the external orifice, this is not a phimoſis, though by ſome improperly ſo called.

This diſorder proceeding from an infection of a malignant gonorrhœa, or the lues venerea, is firſt conveyed to the genitals, and afterwards thro' the pores to the lymph, or ſeminal liquor; the due craſis and natural mixture of which it deſtroys, by inducing partly a cauſtic and corroding, and partly a putrid ſtate thereof: Hence ariſe the pains, the heats, the tumours, the inflammations, and the exulcerations of the genitals. For at firſt the glans only is infected whilſt in coition, the poiſion inſinuating itſelf into the pores; after which, it ſoon proceeds to the glans of the urethra, then to the proſtatæ, and afterwards to the veſiculæ ſeminales. The regimen, during the time of the cure, according to Boerhaave, requires the patient to abſtain from all oily food; and he muſt alſo avoid every thing, which by its acrimonious quality ſtimulates to venery; ſuch as ſpices, bulbous roots, fleſh, eggs, fiſh, and fermented liquors; for as the inflation of the penis retards the cure, it is of the utmoſt conſequence to be avoided; as are alſo every thing elſe that inflames the fancy or provokes to venery, as amorous dalliance with women, *&c.* Water and whey are the beſt drink; and ſeeds and ſummer fruits the beſt aliment. All poſſible care muſt be taken that cold never reach the penis, and that it be kept always moiſt, leſt the pores contracting repel the flux of matter. An emollient and ſomewhat antiſeptic cataplaſm will be beneficial. In the cure, Sydenham's method of purging the patient till the ſymptoms were abated is now juſtly laid aſide. Turner's laſt method, which he made uſe of himſelf, is as follows: Take two drachms of quickſilver; one drachm of gum guaiacum; and beat them, together with a little ſpirit of lemon, till the globules of the mercury diſappear: afterwards add half a drachm of the pills of colocynth with aloes: beat it into a maſs; of which make up twenty-four pills. Two of theſe pills containing half a ſcruple of the mercury, may be taken night and morning; or according to the operation; one only for a week or ten days, unleſs the patient complains of his gums, or a ſore mouth: for then the mercury muſt be left out.

If the cordee does not remit, a ſcruple of ſal prunella may be taken, with as much fine ſugar between whiles, in a draught of the following apozem: Take of mercurial water two pounds; of the ſolution of gum arabic, and ſyrup of marſhmallows, each one ounce; make it into an apozem, or decoction. The mercurial water is common river-water, in two quarts of which four ounces of quickſilver have been boiled to a quart. The patient may drink of the apozem through the whole courſe.

And now, as there is occaſion, the pills are continued for a week, or ten days more, but at night only; and in the morning is given the quantity of a nutmeg of the following electuary: Take virgin-honey, an ounce and a half; balſam of capivi, ſix drachms; powder of the root of jalap, and ſal prunella, of each one drachm, which make into an electuary. The patient muſt drink a draught of the apozem as well after the electuary as after the pill. See the article ELECTUARY.

There is no danger of the running being ſtopt while his body is kept open by theſe means; but when the quantity grows leſs, and the colour whiter and feels more tenacious, the pill is laid aſide, and the electuary kept to ſome days longer, night and morning. If it purges too much, the jalap is left out, and the rhubarb ſubſtituted inſtead thereof. When it proves tedious, boiled turpentine is given by way of farther agglutinating, and drying the gleet.

When the cordee and dyſury, are very

ſtubborn, or the running more virulent than ordinary, the genitals are to be ſmeared every night quite up to the groin, with the weaker blue ointment, and the pill without the quickſilver is given early in the morning in a large doſe, or a draught of the infuſion of ſenna.' This method will ſucceed in three weeks, or a month's time, if the patient is governable.

In the place of mercurials given internally, Aſtruc directs the uſe of crude quickſilver, as in the common unction, to be rubbed upon the parts, as about the body of the penis, eſpecially under the urethra, to the perinæum, and ſo up to the pubes and teſticles, by which the mercury, inſinuating itſelf through the pores into the lymphatic veſſels, is inſtantly conveyed into the glandules and ſubdues the poiſon lodged therein, taking away all the ſymptoms without any diſturbance to the primæ viæ, the ſtomach and guts.

If there is no diſcharge from the penis of any virulent matter, it is called the gonorrhœa ſicca, or dry clap; the ſymptoms of which are a dyſury, or difficulty of making water, and after, from the increaſe of the inflammation and tumefaction, an iſchury, or total ſuppreſſion of urine. See the articles DYSURY, and ISCHURY.

In the cure of the dry clap, Aſtruc adviſes plentiful bleeding in the beginning, to take off the tenſion, and to abate the inflammation; as alſo emollient decoctions of mallows, linſeed, *&c.* in milk, to foment the parts: but perhaps it might be better to make a pultice of theſe ingredients, after Boerhaave's method, to lay to the parts affected; or, which is beſt of all, to uſe them one after the other.

Aſtruc adviſes alſo lenient clyſters, cooling emulſions, and ptiſans, with ſal prunella and anodynes, between whiles. During the continuance of the inflammation, no mercurials muſt be uſed; and if the ſymptoms increaſe, threatening an abſceſs in the perinæum, it is to be forwarded as much as poſſible, by ſuppurative pultices, and the matter diſcharged. The ſymptoms of this diſeaſe being all ſeparately treated of under their ſeveral heads, for the cure and method of treating each, ſee the articles TUMOUR, BUBO, CARUNCLE, GLEET, SHANKER, PHIMOSIS, PARAPHIMOSIS, CRYSTALLINE, CONDYLOMA, CRISTÆ, *&c.*

When the gonorrhœa has continued a long while, or long enough for the poiſonous matter to make its way into the blood; or by aſtringents given unſeaſonably it cannot make its exit; then the patient is infected with the pox. See the article POX.

The third ſpecies of this diſorder requires the very ſame treatment with the ſimple and virulent: but here the leaſt time muſt not be loſt; the affected part muſt be kept in a conſtant ſtate of laxity, by the moſt emollient applications; and the contagious matter muſt with all poſſible expedition be drawn out: for the whole cure depends upon the total diſcharge of the infectious matter, together with the pus, which it has introduced; and if this taſk is not performed, a pox is greatly to be apprehended. Wherefore, if this diſeaſe continues but for a little time, recourſe muſt be had to all the ſeverities of a ſalivation. For though ſalivation does not at all cure either of the two former kinds of gonorrhœa, this ſpecies of the diſeaſe, having its ſeat in the glandulæ cowperianæ of the urethra, ſo that the pus diſcharges itſelf by their excretory duct into the urinary duct, is much more ſuſceptible of the power of mercury.

GOOD, in general, whatever is apt to cauſe or increaſe pleaſure, or diminiſh pain in us; or, which amounts to the ſame, whatever is able to procure, or preſerve to us the poſſeſſion of agreeable ſenſations, and remove thoſe of an oppoſite nature.

By pleaſure and pain, ſays Mr. Locke, I would be underſtood to mean of body or mind, as they are commonly diſtinguiſhed; though, in truth, they are only different conſtitutions of the mind, ſometimes occaſioned by a diſorder in the body, and ſometimes by thoughts of the mind. Pleaſure and pain, and their cauſes good and evil, are the hinges upon which our paſſions turn; ſo that by reflecting on the various modifications or tempers of mind, and the inteſtine ſenſations which pleaſure and pain, good and evil, produce in us, we may thence form to ourſelves the ideas of our paſſions. See PASSION, HAPPINESS, *&c.*

Metaphyſical GOOD, the ſame with perfection. See the article PERFECTION.

Moral GOOD, denotes the right conduct of the ſeveral ſenſes and paſſions, or their juſt proportion and accommodation to their reſpective objects and relations.

The ſame principle, or law of our natures, which determines us to purſue any one end, or ſpecies of good, prompts us to purſue every other end, or ſpecies of good of which we are ſuſceptible, or to which our Maker has given us an original propenſion. But amidſt the great multiplicity of ends or goods, which form the various ingredients of our happineſs, we perceive an evident gradation, or ſubordination; and in the accommodation of our actions thereto, conſiſts their moral goodneſs. Thus, the goods of the body, or of the external ſenſes, ſeem to hold the loweſt rank in this gradation or ſcale of goods. Theſe we have in common with brutes; and when, at any time, they come in competition with goods of a higher order, the unanimous verdict of mankind gives the preference to theſe laſt. Next to ſenſual goods come thoſe ariſing from ſocial connections, as fame, fortune, power, civil authority, and the like, which are chiefly valuable, as being the means of procuring natural or moral good, but principally the latter. Goods of the underſtanding are ſtill ſuperior, as taſte, knowledge, memory, judgment, *&c.* And the higheſt are the moral goods of the mind, directly and ultimately regarding ourſelves, as command of the appetites and paſſions, prudence, fortitude, benevolence, *&c.* Theſe are the principal ingredients of our happineſs.

Moral good is of ſo ſingular and ſublime a nature, that when the mind is in purſuit of it, though it ſhould prove unſucceſsful in its aims, it can reſt in the conduct without repining, or being dejected at the ill ſucceſs: nay, the pleaſure attending the conſciouſneſs of upright aims, and generous efforts, abſorbs the diſappointment, and makes inferior ends diſappear, as of no amount in the great aggregate or ſurpluſage that remains. See the article HAPPINESS.

GOOD ABEARING, in law, denotes much the ſame with good behaviour.

GOOD BEHAVIOUR, in law, an exact carriage and behaviour to the king and his people.

A juſtice of peace may, at the requeſt of another, or where he himſelf ſees cauſe, demand ſurety for the good behaviour; and to that end the juſtice may iſſue out his warrant againſt any perſons whatſoever, under the degree of nobility; but when it is a nobleman, complaint is to be made in the court of chancery, or king's bench, where ſuch nobleman may be bound to keep the peace. Infants and feme-coverts, who ought to find ſurety by their friends, may be bound over to their good behaviour; as alſo lunatics, that have ſometimes lucid intervals, and all others who break the peace, or being ſuſpected to do it, by affrays, aſſaults, battery, wounding, fighting, quarrelling, threatning, *&c.* A perſon may be likewiſe bound to his good behaviour for a ſcandalous way of living, keeping bawdy-houſes, gaming-houſes, *&c.* and ſo may common drunkards, whoremongers, common whores, cheats, libellers, *&c.* He who demands ſurety for the peace, on any violence offered, muſt take an oath before the juſtice, that he goes in fear of his life, or ſome bodily harm, *&c.* and that it is not out of malice, but from a regard to his own ſafety.

GOODS, *bona*, in law, the ſame with chattels. See the article CHATTELS.

Conſignment of GOODS. See the article CONSIGNMENT.

Running, &c. *of* GOODS. See the article RUNNING, *&c.*

GOOD-HOPE, or *Cape of* GOOD HOPE, the moſt ſouthern promontory of Africa, where the Dutch have built a good town and fort: eaſt long. 16° and ſouth lat. 34° 15′.

GOOLE, in law books, ſignifies a breach in a ſea-bank, or wall.

GOOSE, *anſer*, in ornithology, a well known bird of the anas-kind, with the back of a greyiſh brown colour, the belly and edges of the wing-feathers white.

Geeſe are fowls of great profit, both for food, for their feathers, and for their greaſe. For the gathering of their feathers, ſome authors adviſe their being pulled twice a year, *viz.* in March and Auguſt; yet this is certainly an unprofitable as well as a cruel practice; for the gooſe on being incapable of flight, eaſily falls a prey to the fox, and other ravenous creatures, and by uncloathing her, you occaſion her getting cold, which ſuddenly kills her. 'Tis therefore, moſt adviſeable to ſtay till moulting time, or till you kill her, and then all her feathers may be made uſe of at pleaſure.

Gooſe-berry, *groſſularia*, or *ribes*, in botany. See the article Ribes.

The beſt way of raiſing theſe uſeful buſhes is by cuttings, obſerving always to take the handſomeſt ſhoots, and that from branches that bear moſt fruit. Theſe are to be planted in February. See the article Cuttings.

There are a great many ſorts of gooſe-berry, among which the white holland kind is the faireſt, and beſt bearer of all others; the berries being large, tranſparent, and well taſted. The engliſh yellow gooſe-berry is known every where, and fitteſt for culinary uſes while green.

The hedge-hog gooſe-berry is large, well-taſted, and extremely hairy. There is alſo a ſort of green gooſe-berry, that is a very pleaſant fruit.

Gooſe-berries taken in ſeaſon, produce a delicious wine, very proper for ſummer repaſts. Alſo, if throughly preſſed, with an addition of water, and well fermented, they yield in diſtillation the beſt brandy of any of our fruits, and little inferior to french brandy.

Gooſe-neck, in a ſhip, a piece of iron fixed on the end of the tiller, to which the laniard of the whip-ſtaff, or the wheel rope comes for ſteering the ſhip.

Gooſe-wing, in the ſea-language. When a ſhip ſails before, or with, a quarter-wind on a freſh gale, to make the more haſte, they launch out a boom, and ſail on the lee-ſide; and a ſail ſo fitted, is called a gooſe-wing.

GOR, the capital of a province of the ſame name, in the Eaſt-Indies, ſubject to the Mogul: eaſt long. 85°, north lat. 31° 15′.

GOR-COCK, a bird, otherwiſe called a moor-cock. See Moor-cock.

GORCUM, a city of the United Provinces, ſituated in that of Holland, on the river Waal, twenty-two miles eaſt of Rotterdam: eaſt long. 4° 50′, north lat. 51° 50′.

GORDIAN knot, in antiquity, a knot made in the leathers or harneſs of the chariot of Gordius, king of Phrygia, ſo very intricate, that there was no finding where it began or ended.

The inhabitants had a tradition, that the oracle had declared, that he who untied this knot, ſhould be maſter of Aſia. Alexander having undertaken it, was unable to accompliſh it, when fearing leſt his not untying it ſhould be deemed an ill augury, and prove a check in the way of his conqueſts, he cut it aſunder with his ſword, and thus either accompliſhed or eluded the oracle.

GORE, in heraldry, one of the abatements, which, according to Guillim, denotes a coward. It is a figure conſiſting of two arch lines drawn one from the ſiniſter chief, and the other from the ſiniſter baſe, both meeting in an acute angle in the middle of the feſs point. See plate CXI. fig. 2.

GOREING, in the ſea-language, ſloping. A ſail is cut goreign, when it is cut ſloping by degrees, and is broader at the clew than at the earing, as all top-ſails and top-gallant ſails are.

GOREL, the title of the prince of Georgia, in Aſia. See the article Georgia.

GORGE, *gula*, in architecture, the narroweſt part of the tuſcan and doric capitals, lying between the aſtragal, above the ſhaft of the pillar and the amulets. See the articles Tuscan and Doric.

It is alſo uſed for a concave moulding, larger, but not ſo deep as a ſcotia, which ſerves for compartments, &c. See the article Compartment.

Gorge, in fortification, the entrance of the platform of any work.

In all the outworks the gorge is the interval betwixt the wings on the ſide of the great ditch, as the gorge of a ravelin, half-moon, &c. Theſe, it is to be obſerved, are all deſtitute of parapets; becauſe, if there were any, the beſiegers having taken poſſeſſion of the work, might uſe it to defend themſelves from the ſhot of the place; which is the reaſon, that they are only fortified with palliſadoes, to prevent a ſurprize.

The gorge of a baſtion is nothing elſe but the prolongation of the curtins from their angle with the flanks, to the center of the baſtion where they meet. When the baſtion is flat, the gorge is a right line, which terminates the diſtance between the two flanks. See the articles Bastion and Fortification.

GORGED, in heraldry, the bearing of a crown, coronet, or the like, about the neck of a lion, a ſwan, &c. and in that caſe it is ſaid, the lion or cygnet is gorged with a ducal coronet, &c.

Gorged is alſo uſed when the gorge, or neck of a peacock, ſwan, or the like bird, is of a different colour or metal, from the reſt.

GORGED, among farriers, *&c.* ſignifies the ſame as ſwelled; in which ſenſe they ſay, the legs of a horſe are gorged; the paſtern joint is gorged; you muſt walk him out to diſgorge his ſhoulder.

GORGERIN, in architecture, the ſame with gorge. See the article GORGE.

GORGONA, the name of two iſlands, one in the pacific ocean on the coaſt of Peru: weſt long. 79°, north lat. 3°; the other in the Mediterranean, twenty-five miles weſt of Leghorn.

GORGONS, in antiquity, a warlike female nation of Lybia, in Africa, who had frequent quarrels with another nation of the ſame ſex, called Amazons.

GORITIA, or GORITZ, a town of Carniola, in Auſtria, near the confines of the territories of Venice: eaſt longitude 14°, north latitude 46° 20′.

GORLITZ, a city of Upper Saxony, in Germany, fifty miles eaſt of Dreſden: eaſt long. 15° 6′, north lat. 51° 12′.

GOSHAWK, the engliſh name of the yellow-legged falcon, with a brown back, and a white variegated breaſt. See the article FALCON.

It is a large and very beautiful bird, which preys upon the pheaſant, mallard, wild gooſe, hare, and coney, and will even venture to ſeize on a kid or goat. She ought to be kept with great care, as being very choice and dainty.

GOSLAR, an imperial city of Lower Saxony, in Germany, thirty miles ſouth of Brunſwic: eaſt longitude 10° 30′, north latitude 52°.

GOSPEL, the hiſtory of the life, actions, death, reſurrection, aſcenſion and doctrine of Jeſus Chriſt.

The word is ſaxon, and of the ſame import with the latin term *evangelium*, or the greek *ευαγγέλιον*, which ſignifies glad tidings, or good news; the hiſtory of our bleſſed Saviour being the beſt news ever publiſhed to mankind.

This hiſtory is contained in the writings of St. Matthew, St. Mark, St. Luke, and St. John; who from thence are called evangeliſts. The chriſtian church never acknowledged any more than theſe four goſpels as canonical; notwithſtanding which, ſeveral apocryphal goſpels are handed down to us, and others are entirely loſt.

The antient fathers endeavoured to find out divers myſteries in their being but four genuine canonical goſpels. St. Jerom, in particular, ſays, that as there are four parts of the world, and four principal winds, it was alſo proper there ſhould be four goſpels in the church, as four columns to ſupport it, and four breathings of life to render it immortal. They thought they found the figure of the four evangeliſts in the beginning of the prophecy of Ezekiel, and in the ninth chapter of the Revelations, where mention is made of four living creatures, the firſt having the face of a man; the ſecond of a lion; the third of an ox; and the fourth of an eagle; and for this reaſon the evangeliſts are uſually painted with theſe ſymbols.

GOSSYPIUM, COTTON, in botany, a genus of the monadelphia-polyandria claſs of plants, the flower of which conſiſts of five plane and patent petals, growing together at their baſes, and vertically cordated: the fruit is a roundiſh capſule, containing four cells, with a great number of oval ſeeds, ſurrounded with a fine downy matter. See COTTON.

GOSTAVIN, or GOSTIVIN, a town of great Poland: eaſt long. 20°, north lat. 52° 45′.

GOTHA, the capital of the dutchy of Saxe-Gotha, in Upper Saxony: eaſt longitude 10° 36′, north latitude 51°.

It is ſubject to the duke of Saxe-Gotha, brother of her royal highneſs the princeſs dowager of Wales.

GOTHIC, in general, whatever has any relation to the Goths: thus, we ſay gothic cuſtoms, gothic architecture, *&c.* See the article ARCHITECTURE.

Gothic architecture is far removed from the manner and proportions of the antique; having its ornaments wild and chimerical, and its profiles incorrect. However, it is frequently found very ſtrong, and appears very rich and pompous, as may be ſeen in ſeveral of our engliſh cathedrals. This manner of building was, originally, very heavy and courſe; but is ſince run into the oppoſite extreme, being ſlender, rich, and delicate to a fault. In the gothic architecture, we ſee high vaults raiſed on ſlender pillars; and every thing crouded with windows, roſes, croſſes, figures, *&c.*

GOTHIC CHARACTER, or LETTER. See the article LETTER.

GOTHIC COLUMN. See COLUMN.

GOTHLAND, the moſt ſouthern province of Sweden, being a peninſula ſurrounded on three ſides by the Baltic Sea. It is ſubdivided into eaſt and weſt Gothland, Smaland, Halland, Bleken and Schonen.

Gothland, is alſo an iſland of the Baltic, ſituated between the province of Gothland and Livonia.

GOTTENBURG, a port-town of Sweden, ſituated without the Sound, on the coaſt of the Schaggerack Sea, near the entrance of the Baltic.

GOTTINGEN, a city of Germany, in the circle of Lower Saxony, and dukedom of Brunſwic: eaſt longitude 9° 45′, north latitude 51° 32′.

GOTTORP, a city of the dukedom of Sleſwic, in Denmark, and capital of the territories of the duke of Holſtein-Gottorp: eaſt long. 10°, north lat. 54° 40′.

GOUDE, a city of the United Netherlands, in the province of Holland, ten miles north-eaſt of Rotterdam.

GOUDHURST, a market-town of Kent, nine miles ſouth-weſt of Maidſtone.

GOVERNMENT, in general, is the polity of a ſtate, or an orderly power conſtituted for the public good.

Civil government was inſtituted for the preſervation and advancement of men's civil intereſts, and for the better ſecurity of their lives, liberties, and properties. The uſe and neceſſity of government is ſuch, that there never was an age or country without ſome ſort of civil authority: but as men are ſeldom unanimous in the means of attaining their ends, ſo their difference in opinion in relation to government, has produced a variety of forms of it. To enumerate them, would be to recapitulate the hiſtory of the whole earth. But they may, in general, be reduced to one of theſe heads: either the civil authority is delegated to one or more, or elſe it is ſtill reſerved to the whole body of the people; whence ariſes the known diſtinction of government into monarchy, ariſtocracy, and democracy. See Ariſtocracy, Democracy, *&c.* Mr. Hooker thinks, that the firſt government was arbitrary, and adminiſtered by a ſingle perſon; till it was found by experience, that to live by one man's will, was the cauſe of all men's miſery: and this, he concludes, was the original of inventing laws. The roman, and moſt of the grecian ſtates, were built upon the republican plan; but when the Goths, and other northern nations, deſtroyed the roman empire, and extended their conqueſts into far diſtant countries, they eſtabliſhed, wherever they came, a mixed form of government. The preſervation of this conſtitution depending upon the balance between the king, nobility, and people, the legiſlative power was lodged in theſe three ſtates, called by different names in different countries; in the north, diets; in Spain, cortes; in France, eſtates; and in Britain, parliaments. The excellency of this mixed government, conſiſts in that due poize or balance between rule and ſubjection, ſo juſtly obſerved in it, that by the neceſſary concurrence of the nobility and commons, in the making and repealing all laws, it has the main advantage of an ariſtocracy, and a democracy, and yet is free from the diſadvantages and evils of either of them. This mixed form of government is, however, now driven almoſt out of Europe, in ſome parts of which we can hardly find the ſhadow of liberty left, and in many, there is no more than the name of it remaining. France, Spain, Portugal, Denmark, and part of Germany, were all, an age or two ago, limited monarchies, governed by princes, well adviſed by parliaments or cortes, and not by the abſolute will of one man. But now all their valuable rights and liberties are ſwallowed up by the arbitrary power of their princes: whilſt we in Great Britain have ſtill happily preſerved this noble and antient gothic conſtitution, which all our neighbours once enjoyed. There is ſuch a due balance of property, power and dominion in our conſtitution, that, like the antient government of Sparta, it may be called an empire of laws, and not of men; being the moſt excellent plan of limited monarchy in the world.

Governments are commonly divided into two claſſes, arbitrary and free-governments; but there are many different ſorts of each. Thus the governments of France and Spain are generally called arbitrary; tho' they differ as much from the governments of Turky and other eaſtern empires, where abſolute deſpotiſm prevails, as they do from the government of England, and other european nations, where liberty is ſaid to flouriſh in its fulleſt perfection.

Government is alſo a poſt or office which gives a perſon the power or right to govern or rule over a place, a city, or province, either ſupremely or by deputation.

Government is alſo uſed for the city, country, or place to which the power of governing is extended. In France there are thirty-eight governments of provinces independent of each other; and beſides theſe there are twelve grand governments,

ments, which are thoſe of the iſle of France, Burgundy, Normandy, Guienne, Brittany, Champaign, Languedoc, Piccardy, Dauphiny, Provence, Lyonois, and Orleanois: but theſe laſt are only ſo many claſſes of governors or governments, contrived for the better and eaſier regulating the ſeats, *&c.* of the many governors, bailiffs, provoſts, *&c.* who are obliged to aſſiſt at the general eſtates.

GOVERNMENT, in grammar, a part of conſtruction uſually called regimen. See CONSTRUCTION and REGIMEN.

GOUGE, an inſtrument or tool uſed by divers artificers; being a ſort of round hollow chiſſel, for cutting holes, channels, grooves, *&c.* either in wood or ſtone. See the article JOINERY.

GOURD, *cucurbita*, in botany. See the article CUCURBITA.

Gourd ſeeds are of the number of the four greater cold ſeeds. They are eſteemed cooling and diuretic, and are uſed in emulſions, and ſome compoſitions of the ſhops. They are good in fevers, and in all diſorders ariſing from an acrimony of the blood or humours. Emulſions of theſe, and the other cold ſeeds, are anodyne, and are generally uſed to take off ſtranguries occaſioned by bliſters.

We have our gourd-ſeeds from Holland. They ſhould be choſen large and plump, freſh, and full of pulp, and of a good taſte.

Bitter GOURD, a name given to the colocynthis. See the article COLOCYNTHIS.

Indian GOURD, the ſame with the creſcentia of botaniſts. See CRESCENTIA.

GOURDY LEGS, in horſes, the diſorder otherwiſe called greaſe. See GREASE.

GOUST, or GOUT, ſignifies taſte or ſkill in poetry, painting, *&c.*

GOUT, *arthritis*, in medicine, as defined by Boerhaave, a very painful diſeaſe, whoſe ſeat is in the joints and ligaments of the feet, and whoſe principal times of invaſion are the ſpring and autumn.

This diſeaſe, according to the forementioned author, ſeldom invades any patient till he is upwards of thirty; and men are more ſubject to it than women; as alſo all perſons of acute parts that follow their ſtudies too cloſe, eſpecially in the night-time, with an intenſe application of mind. Likewiſe thoſe who live high, and indulge their appetites; drinking plentifully of rich generous wines; or who uſe acids too freely, or white eager wines; or who have been addicted too early to venereal pleaſures; or whoſe bodies are large, groſs, and full. Thoſe are liable to it whoſe ſweaty feet are too ſuddenly chilled; or who ſuffer their feet to ſweat in wet ſhoes and ſtockings. Hence hunting and riding in the cold are pernicious. It may likewiſe be received by contagion, and is hereditary, deſcending from father to ſon.

In treating of this diſeaſe we ſhall, from the authority of Sydenham, firſt give an account of what that writer calls the regular gout, and afterwards of what he calls the irregular: by the latter is meant a gout which, by the prepoſterous uſe of improper medicines, has been turned out of its natural courſe; or, by reaſon of the patient's weakneſs, cannot attain to its proper and genuine ſymptoms.

The regular gout makes its onſet in the following manner. It uſually ſeizes the patient in the latter end of January, or beginning of February, all of a ſudden, without any previous notice, unleſs the patient has been troubled with crudities of the ſtomach, and indigeſtion for ſome weeks before: the body likewiſe, in many, ſeems to have been puffed up with wind, with a kind of heavineſs, which daily increaſes, till at length the fit comes thundering on; a few days before which there is a torpor, and, as it were, a deſcent of wind down the muſcles of the thigh, with a kind of ſpaſmodic affection of them. Likewiſe the day before the fit, the appetite is more voracious, but not natural.

Though the patient ſeems to go to bed in good health, yet commonly about two in the morning, he is alarmed by a pain which moſt frequently affects the great toe, ſometimes the heel, the ancle, or the calf of the leg, which pain reſembles that of diſlocated bones: there is likewiſe a ſenſation, as if water, almoſt cold, was poured on the membranes of the part affected. Soon after a ſhivering and ſhaking ſupervene, with a feveriſh diſorder. The pain, which at firſt was tolerable, becomes more violent, as the ſhaking decreaſes, and grows more intenſe every hour till night; and then it is at the height, ſettling itſelf about the little bones of the tarſus and metatarſus, whoſe ligaments it affects. Now there ſeems to be a violent extenſion of the ligaments; or there is a ſenſation of their being lacerated: ſometimes they ſeem to be preſſed or ſqueezed together. At this time the parts affected become ſo exceeding ſenſible, that they cannot bear the weight of the ſheet, nor the ſhaking of the room by a perſon walking about, unleſs he treads very ſoftly. This always happens at the acceſſion of the fit. About twenty-four hours after this, the patient perceives the part to be ſwelled, and the pain much abated.

The next day, or perhaps two or three days afterwards, if the gouty matter is copious, the part affected is a little in pain. In a few days, the other foot begins to be affected in the ſame manner; and if the pain has ceaſed in the firſt, the weakneſs which it left behind ſoon vaniſhes; the ſame tragedy is now acted over again. Sometimes when the gouty matter is in great plenty, it attacks both feet at once, but it generally ſeizes one after the other.

After both feet hath been tormented, the fits which follow are out of rule, both as to the time of invaſion and the duration; only the pain grows more intenſe at night, and remits in the morning. From a ſeries of thoſe ſmall fits ariſes what is called a fit of the gout, which is longer or ſhorter, according to the patient's age. This happens to the more vigorous, and whom the gout ſeldom viſits, in fourteen days; to perſons advanced in years, who have often felt its rage, two months: but thoſe who are debilitated with age, or the long ſtay of the diſeaſe, it does not leave till ſummer; which being pretty far advanced, drives it away.

When the fit goes off, there is an intolerable itching in the affected foot, chiefly between the toes, from which, and from the feet, fall branny ſcales, as if the patient had ſwallowed poiſon: the diſeaſe thus terminated, the patient's good habit of body and appetite return in proportion to the ſeverity of the pain in the laſt fit, and in the ſame proportion the next fit will be either accelerated or retarded: for if the laſt was very ſevere, the next will not come on in leſs time than a ſolar revolution.

Such is the regular gout and its genuine ſymptoms; but when it is diſturbed by incongruous medicines, and the patient is worn out by the long continuance of the diſeaſe, it becomes irregular, and the ſubſtance of the body is as it were changed into a fomes of the diſeaſe, and nature becomes unequal to the taſk of conquering the diſeaſe thus changed in the accuſtomed manner.

The feet were at firſt the ſeat of the diſeaſe, but now it attacks the hands, wriſts, elbows, knees, and other parts of the body: ſometimes it ſo diſtorts the fingers, as to make them reſemble a bunch of parſnips; and at length ſtoney concretions appear about the ligaments of the joints, which breaking through the ſkin, reſemble chalk, or crab's eyes. Sometimes the gouty matter invades the elbows, and creates a whitiſh ſwelling of the ſize of an egg, which ſoon aſſumes a red colour, and becomes inflamed: ſometimes it affects the thigh in ſuch a manner, as if a great weight was hung thereon; and yet without any remarkable pain: from thence it deſcends to the knee, which it attacks more roughly, hindering all motion.

Now the gout afflicts the patient all the year, except for two or three months in ſummer; and the particular fit which did not laſt above a day or two, continues ten or fifteen days: the patient is diſturbed with ſickneſs as well as pain; his limbs begin to be contracted and unfit for motion; and if he attempts any exerciſe beyond his ſtrength, the fomes of the diſeaſe will attack the viſcera in a more dangerous manner.

The curative intention, according to Wintringham, requires, firſt, that the primæ viæ be ſet free from a load of indigeſted crudities, and the viſcera be reſtored to their priſtine vigour; ſecondly, that the fluid ſtagnating in, and ſtuffing up the ſmaller veſſels, may be expelled the body, and a free paſſage through the contracted veſſels be reſtored.

The firſt intention may be anſwered by vomits and gentle cathartics repeated as occaſion requires; by bitters, aromatics, antiſcorbutic medicines; by alkaline fixed ſalts, taken in ſmall quantities for a long time; by aliments and drinks that are nouriſhing, light, eaſy of digeſtion, quickly aſſimulated, and taken in due quantity; by powerful exerciſe often repeated, and long continued; and eſpecially by riding in a dry, ſerene, pure air; by frictions; by motion of the affected parts; by going to ſleep at early hours.

The ſecond intention may be anſwered partly by the preceding, as well as by procuring gentle ſweats; by bathing in natural and artificial baths; by ſweating in a bagnio; or by the uſe of volatile ſalts, and copious drinking of attenuating liquors, actually hot, in the morning while in bed, in order to procure a ſweat; as alſo by mercurial purges, taking a large quantity of diluents after them; by frictions of the whole body, eſpecially the parts affected, with hot, dry, linen-cloths, till a redneſs appear; by cold baths, and the like.

To abate the exceſſive pain in the part affected, Boerhaave ſays, that if there be an abſolute neceſſity, opiates may be given internally, and the patient may drink plentifully of hot whey, or any other liquor of the like nature. Externally emollients and anodynes may be uſed, laid on pretty hot; or the part affected may be beat with nettles; or it may be anointed with terebinthinated balſam of ſulphur; or tow may be burnt thereon.

Sydenham ſays, that though there is nothing of any moment to be done in the fit; yet that it will be proper to abſtain from fleſh for ſome days, and to live on water-gruel, or ſuch-like diet, but no longer than the ſtomach is averſe to fleſh, for fear of bringing on a diſturbance of the animal ſpirits: but then great care ſhould be taken in the diet, both as to quantity and quality. See the article DIET.

Dr. Cheyne adviſes, that as ſoon as the pain is almoſt gone, and the ſwelling and weakneſs only remain, nothing can be better than warm ſtomachic and ſpicey purges, doſed and repeated, according to the ſtrength of the patient. This being premiſed, if the patient's ſtrength is impaired, and fleſh waſted, he adviſes aſſes milk with pearl, half a pint or a pint in the morning early, or at five or ſix o'clock in the afternoon; and to keep up the appetite which the milk commonly palls, and to prevent its cooling effects on the ſtomach, a light bitter made of gentian, cinnamon, and orange-peel, only the laſt double to the other two, infuſed in ſherry or white-wine, and taken two hours before meals, may be uſed moſt conveniently.

Out of the fit, Sydenham preſcribes a medium of diet to be obſerved; the patient ſhould eat no more than the ſtomach will digeſt, nor ſhould he be ſo abſtemious as to defraud the parts of ſuch a proportion of aliments as is neceſſary to maintain their ſtrength and vigour. As to the quality of the food, the patient's palate is to be conſulted, but he ſhould dine upon one diſh of meat only; he ſhould, however, not eat any thing that is ſharp, ſalted, or ſeaſoned with ſpices: he ſhould eat no ſuppers, but inſtead thereof drink a draught of good ſmall-beer. The moſt ſuitable drink is ſuch as is not ſo ſtrong as wine, nor ſo weak as water: of this ſort is the London table beer, or water with a little wine; but when the gouty matter has ſeized the whole body, he muſt abſtain from all fermented liquors, though ever ſo mild and ſmall, and uſe the following decoction only. Take of the root of ſarſaparilla ſix ounces; ſaſſafras wood, china root, and the ſhavings of hartſhorn, each two ounces; liquorice root, an ounce; boil them together in two gallons of ſpring-water for half an hour. Afterwards infuſe them upon hot aſhes, cloſe covered for twelve hours: then boil them till a third part of the liquor is exhaled, and as ſoon as it is taken off the fire, infuſe therein half an ounce of aniſeeds for two hours. Laſtly, ſtrain it off and let it reſt till it become clear, and put it up into bottles for uſe.

Regard muſt likewiſe be had to the ſymptoms, which in the fit endanger the patient's life. The moſt common is a weak and languid ſtomach, attended with ſickneſs and gripes, as if from wind. In this caſe nothing is better than a glaſs of canary drank now and then, together with exerciſe; but if the ſymptom will not yield to this, give twenty drops of the thebaic tincture in ſpirituous alexiterial water, provided the head is not attacked, and let the patient compoſe himſelf to reſt. If the ſymptom will not yield to this, ſweating is preſcribed, as alſo in a diarrhœa, when laudanum fails: but if there is a tranſlation of the gouty matter to the lobes of the lungs, and the pain has left the joints, this ſymptom is to be treated as a peripneumony. See the article PERIPNEUMONY.

If the nephritic pains ſhould come upon the gout, let the patient omit all other medicines, and drink a large quantity of poſſet-drink, in which the leaves and roots of mallows and marſh-mallows have been boiled. Then let a clyſter be given, and afterwards a doſe of laudanum.

When the gout has ſeized on the head, Dr. Cheyne orders it to be treated as any other violent head-ach, or an inflammation of the brain and its membranes. In young and ſtrong conſtitutions, mercurial and antimonial vomits will do wonders; likewiſe gentle ſtomach-purges are to be poured down continually, that is two or three ſpoonfuls every third-hour, till the effect is obtained. See the articles HEAD-ACH and VOMIT.

Pitcairn aſſerts, that the gout may be cured in the ſame manner as the lues venerea, by a ſalivation, and a decoction of the woods; and Cheyne allows, that a full and free ſalivation will cure the gout for ſeveral years, but then it ſhatters the conſtitution ſo much, that the future fits become worſe for it: but however this is no objection againſt a common mercurial courſe, which Dr. James, after repeated trials, has found very efficacious in the cure of the gout, of which the ſeveral caſes publiſhed in his treatiſe of the gout, are a ſufficient teſtimony.

Cheyne likewiſe obſerves, that a dram of powdered ſulphur, or flower of brimſtone, taken regularly in a ſpoonful of milk, has prevented the fit for many years. It moves the body gently once or twice a day.

Muſgrave, to bring the gout back from the noble parts to the joints, had a great opinion of the alcohol martis. See the article ALCOHOL.

If this does not excite a pain in the joints in four or five days, recourſe muſt be had to externals; ſuch as the cephalic plaſter, ceratum viride, or hat-caſe; or the parts muſt be ſtung with nettles.

De Sault, ſuppoſing the gout depends on the want of perſpiration, propoſes warm baths, exerciſe, avoiding cold as much as poſſible, clean linen and other cloaths, moderate eating, abſtinence from ſuppers, frictions, tranquillity of mind, and a milk diet, as preſervatives againſt it. He recommends garlic in the ſummer, and ſteel and the peruvian bark in the winter. When the ſtomach is attacked, he lets blood at the ancles, and applies epiſpaſtics of different kinds to the feet; and then endeavours to procure a general ſweat. When the pain is very violent, he blunts it by applying a cloth dipt in liquid laudanum, and exhorts the patient to uſe exerciſe after this.

Cheyne ſays, that mercurial vomits are not only proper for the gout in the ſtomach, but that they are abſolutely neceſſary, as well as the mercurial purges, when the gout becomes fixed to and permanent in a part, as alſo when it is diſperſed all over the habit like a rheumatiſm; that theſe active medicines muſt firſt render the humours fluid, which gum guaiac, with diaphoretic antimony, will afterwards carry off.

GOUT-WORT, in botany, a term ſometimes uſed for angelica. See ANGELICA.

GOUTY-LAND, among farmers, denotes a mooriſh, cold and black ſoil, abounding with ſprings.

In Staffordſhire this ſort of land is ordered much in the ſame manner as heathy land, only that it is uſually burnt deeper. It bears little but oats, white oats upon the gouty, and black oats upon the black cold land.

The turf of theſe grounds burnt, and carried upon rye or barley-lands, is eſteemed a better improvement than dung.

GOWN, *toga*, a well known garment, worn by divines, lawyers, *&c.* who are therefore called gown-men, or gentlemen of the gown.

The citizens of antient Rome all wore gowns, *togæ*; whence the appellation given them of *gens togata*. See the articles TOGA, PRETEXTA, *&c.*

GRABATARII, in church-hiſtory, a name antiently given to perſons who deferred receiving of baptiſm, till on their death-bed.

GRABOW, or GRUBOW, a town of Lower Saxony, and dutchy of Mecklenburg: eaſt longitude 11° 36′, north latitude 53° 32′.

GRACE, *gratia*, among divines, ſignifies any unmerited gift which God beſtows on mankind.

Divines diſtinguiſh grace into habitual and actual: the firſt reſides ſtatedly in us, is fixed in the ſoul, and remains till it is expunged by ſome grievous wilful ſin. This is alſo called juſtifying grace, as it makes us appear innocent and righteous in the ſight of God; and ſanctifying grace, as it makes us holy and devoted to God. Actual grace is that which God gives us for the ſpecial performance of ſome particular good thing, as to convert us, to enable us to reſiſt a particular temptation, *&c.*

Grace is alſo divided into natural and ſupernatural: the natural including the gifts of being, life, of rational faculties, an immortal ſoul, *&c.* and the ſupernatural, is conſidered as a gift conferred on intelligent beings in order to their ſalvation.

GRACE, in geography, a city of Provence, in France, fifteen miles ſouth-weſt of Nice: eaſt long. 6° 50′, north lat. 43° 40′.

Act of GRACE, an act of parliament for a general and free pardon, and for ſetting at liberty inſolvent debtors.

Days of **GRACE**, in commerce. See DAY.

GRACE is alſo a title of dignity given to dukes, archbiſhops, and in Germany, to barons and other inferior princes.

GRACE *of God*, or *By the Grace of God*, a formula uſed by ſovereign princes, to expreſs their independence. Thus in ſpeaking of his britannic majeſty, the formula runs thus: "George, by the grace of God, king of Great Britain, *&c.*"

GRACES, *gratiæ*, among canoniſts, the ſame with proviſions. See PROVISION.

GRACES, in heathen mythology, three goddeſſes, whoſe names were Aglia, Thalia, and Euphroſyne; that is, ſhining, flouriſhing, and gay; or according to ſome authors, Paſithea, Euphroſyne, and Ægiale. Some make them the daughters of Jupiter, and Eurynome, or Eunomia, the daughter of Oceanus; but the moſt common opinion is, that they were the daughters of Bacchus and Venus.

They are ſometimes repreſented dreſſed, but more frequently naked, to ſhew, perhaps, that whatever is truly graceful, is ſo in itſelf, without the aid of exterior ornaments. They preſided over mutual kindneſs and acknowledgment; beſtowed liberality, eloquence, and wiſdom, together with a good grace, gaiety of diſpoſition, and eaſineſs of manners.

GRACILIS, in anatomy, a muſcle of the leg, ſo called from its ſlenderneſs: it ariſes from the ſynchondroſis of the os pubis.

GRACULUS, the JACKDAW, in ornithology, a ſpecies of corvus. See the articles CORVUS and JACKDAW.

GRACULUS PALMIPES, a ſpecies of pelican, called in engliſh the ſhag. See SHAG.

GRADATION, in general, the aſcending ſtep by ſtep, or in a regular and uniform manner.

GRADATION, in architecture, a flight of ſteps, particularly in aſcending from the cloiſter to the choir in churches.

It alſo denotes an artful diſpoſition of ſeveral parts, as it were by ſteps and degrees, after the manner of an amphitheatre; ſo that thoſe placed before, are rather ſerviceable than the contrary, to thoſe behind.

GRADATION, in logic, is an argumentation, conſiſting of four or more propoſitions, ſo diſpoſed, as that the attribute of the firſt is the ſubject of the ſecond; and the attribute of the ſecond, the ſubject of the third; and ſo on, till the laſt attribute come to be predicated of the ſubject of the firſt propoſition; as in Porphery's tree; 'man is an animal; an animal is a living thing; a living thing is a body; a body is a ſubſtance; therefore man is a ſubſtance.' An argument of this kind is liable to a world of fallacies, both from the ambiguity of words and things. *e. gr.* 'Peter is a man; man is an animal; animal is a genus; genus is an univerſal; therefore, Peter is an univerſal.'

GRADATION, in painting, a gradual and inſenſible change of colour, by the diminution of the teints and ſhades.

GRADATION, in rhetoric, the ſame with climax. See the article CLIMAX.

GRADISKA, a city of Sclavonia, ſituated on the river Save, twenty-five miles, weſt of Poſega: eaſt long. 18°, north lat. 45° 33′.

GRADO, in the italian muſic, the ſame with degree. See the articles DEGREE and CONJOINT.

GRADO, in geography, an iſland of the Adriatic ſea, thirty-five miles north-eaſt of Venice.

GRADUAL, *graduale*, in eccleſiaſtical writers, a book containing prayers to be uſed after the epiſtle.

The romaniſts ſtill give the name gradual to a verſe ſung after the epiſtle.

GRADUATE, a perſon who has taken a degree in the univerſity. See the article DEGREE.

GRADUATION, in mathematics, the act of graduating or dividing any thing into degrees, or equal parts.

GRADUS, a degree. See DEGREE.

GRAFFER, a term met with in law books, ſignifying a notary or ſcrivener.

GRAFFIUM, a term alſo found in law-books, for a regiſter or chartulary of deeds and other evidences.

GRAFT, or **GRAFF**, in gardening, a cion or ſhoot of a tree inſerted into another, ſo as to make it yield fruit of the ſame nature with that of the tree from whence the graft was taken.

In the choice of grafts, the following directions ſhould be carefully obſerved: 1ſt. That they are ſhoots of the former year. 2dly. That they are taken from healthy fruitful trees. And, 3dly. That you prefer thoſe grafts which are taken from the lateral or horizontal branches, to thoſe taken from the perpendicular ſhoots. Theſe grafts ſhould be cut off from the trees before the buds begin to ſwell, which is generally three weeks or a month before the ſeaſon for grafting;

therefore when they are cut off, they ſhould be laid in the ground with the cut downwards, burying them half their length, and covering their tops with dry litter, to prevent their drying: if a ſmall joint of the former year's wood be cut off with the cion, it will preſerve it the better; and when it is grafted, this may be cut off; for the grafts muſt be cut to a proper length before they are inſerted into the ſtocks; but till then, the ſhoots ſhould remain their full length, as they were taken from the tree, which will preſerve them better from ſtriking. If theſe grafts are to be carried to a conſiderable diſtance, it will be proper to put their cut ends into a lump of clay, and to wrap them up in moſs, which will preſerve them freſh for a month or longer: but theſe ſhould be cut off earlier from the trees, than thoſe which are to be grafted near the place where the trees are growing. For the choice of ſtocks for grafting, ſee the article STOCK.

GRAFTING, or ENGRAFTING, is the taking a ſhoot from one tree, and inſerting it into another; in ſuch a manner, as that both may unite and become one tree. See the article GRAFT, *ſupra.*

The uſe of grafting is to propagate any curious ſorts of fruit, ſo as to be certain of the kinds; which cannot be done by any other method: for as all the good fruit have been actually obtained from ſeeds; the ſeeds of theſe, when ſown, will, many of them, degenerate, and produce ſuch fruit as are not worth cultivating: but when ſhoots are taken from ſuch trees as produce good fruit, theſe will never alter from their kind, whatever be the ſtock or tree on which they are grafted; for though the graft receive their nouriſhment from the ſtocks, yet they are never altered by them, but continue to produce the ſame kind of fruit as the tree from which they were taken.

General directions for GRAFTING. All ſuch trees as are of the ſame genus, *i. e.* which agree in their flower and fruit, will take upon each other; for inſtance, all nut-bearing trees may be ſafely grafted on each other; as may alſo the plum-bearing trees, under which head I reckon not only the ſeveral ſorts of plums, but alſo the almond, peach, nectarine, apricot, *&c.* which agree exactly in their general characters by which they are diſtinguiſhed from all other trees: but many of theſe are very ſubject to emit large quantities of gum from ſuch parts of the trees as are deeply cut and wounded, which, in the tender trees of this kind, *viz.* peaches and nectarines, being more common and hurtful, it is found to be the ſureſt method to bud or inoculate them. See INOCULATION.

All ſuch trees as bear cones will do well upon each other, though they may differ in one being ever-green, and the other ſhedding its leaves in winter; as is obſervable in the cedar of Libanus, and the larch-tree, which are found to ſucceed upon each other very well: but theſe muſt be grafted by approach; for they abound with a great quantity of reſin, which is apt to evaporate from the graft, if ſeparated from the tree before it be joined with the ſtock, whereby they are often deſtroyed; as alſo the laurel on the cherry, or the cherry on the laurel. All the maſt-bearing trees will alſo take upon each other, and thoſe which have a tender ſoft wood, will do well if grafted in the common way; but thoſe of a more firm contexture, and that are ſlow growers, ſhould be grafted by approach.

By ſtrictly obſerving this rule we ſhall ſeldom miſcarry, provided the operation be rightly performed and at a proper ſeaſon, unleſs the weather ſhould prove very bad. It is by this method that many kinds of exotic trees are not only propagated, but alſo rendered hardy enough to endure the cold of our climate in the open air; for being grafted upon ſtocks of the ſame ſort that are hardy, the grafts are rendered more capable of enduring the cold; as has been experienced in moſt of our valuable fruits now in England, which were formerly tranſplanted hither from more ſoutherly climates.

Methods of GRAFTING. We ſhall now give the methods of grafting, only firſt obſerving, that before the operation is begun, the following tools and materials ought to be provided, *viz.* a ſmall hand-ſaw, to cut off the heads of large ſtocks; a good ſtrong knife with a thick back, to make clefts in the ſtocks; a ſharp penknife to cut the grafts; a grafting chiſſel, and a ſmall mallet; baſs ſtrings or woollen yarn; and a quantity of clay, which ſhould be prepared a month before it is uſed, in the following manner: get ſome ſtrong, fat loam; then take ſome new ſtone-horſe dung, and break it in amongſt the loam; if you cut a little ſtraw or hay very ſmall, and mix amongſt it, the loam will hold together the better; and if there be a quantity of ſalt added, it will prevent the clay from dividing in dry weather; this compound ſhould be well ſtirred together, and water put to it in the manner of making mortar; after which it ſhould be moiſtened afreſh, and ſtirred every other day; but it ought to be remembered, that it ſhould not be expoſed to the froſts, or to drying winds. Of late years, ſome have made uſe of another compoſition for grafting, which they have found to anſwer the intention of keeping out the air, better than the clay juſt preſcribed. This is compoſed of turpentine, bees-wax, and roſin, melted together, which when of a proper conſiſtence, may be put on the ſtock round the graft, in the ſame manner as the clay is uſually applied; and though it be not above a quarter of an inch thick, yet it will keep out the air more effectually than the clay; and as cold will harden it, there is no danger of its being hurt by froſt, which is very apt to cauſe the clay to cleave and ſometimes fall off; and when the heat of ſummer comes on, this mixture will melt and fall off without any trouble; but you muſt be careful not to apply it too hot, leſt you injure the graft.

There are ſeveral ways of grafting, the principal of which are the following.

GRAFTING *in the rind,* alſo called crown-grafting, and ſhoulder-grafting, is only proper for large trees, where either the head of the large branches are cut off horizontally, and two or four cions put in, according to the ſize of the branch or ſtem: in doing of this the cions are cut flat on one ſide, with a ſhoulder to reſt upon the crown of the ſtock; then the rind of the ſtock muſt be raiſed up, to admit the cion to enter about two inches between the wood and the bark of the ſtock, ſo as the ſhoulder of the cion may meet, and cloſely join the crown of the ſtock; and after the number of cions are inſerted, the whole crown of the ſtock ſhould be well clayed over, leaving two eyes of the cions uncovered. This method of grafting was formerly much more in practice than it is at preſent: its diſcontinuance was occaſioned by the ill ſucceſs with which it has been attended, from the cions being frequently blown out by ſtrong winds, after they had made large ſhoots; which has ſometimes happened after they have had five or ſix years growth; ſo that whenever this method is practiſed, there ſhould be ſtakes faſtened to ſupport the cions, till they have almoſt covered the ſtock. This method of grafting is generally performed about the latter end of March, or the beginning of April.

Cleft-GRAFTING, alſo termed ſtock or ſlit-grafting, is practiſed upon ſtocks or trees of a ſmaller ſize, from an inch to two inches or more in diameter, and may be uſed with ſucceſs where the rind of the ſtock is not too thick. This method of grafting is to be performed in the months of February and March; and in doing it, the head of the ſtock or branch muſt be cut off with a ſlope, and a ſlit made the contrary way in the top of the ſlope, deep enough to receive the cion, which ſhould be cut ſloping like a wedge, ſo as to fit the ſlit made in the ſtock, being careful to leave that ſide of the wedge which is to be placed outward, much thicker than the other; and in putting the cion into the ſlit of the ſtock, great care muſt be taken to join the rind of the cion to that of the ſtock; for if theſe do not unite, the grafts will not ſucceed: when this method of grafting is uſed to ſtocks which are not ſtrong, it will be proper to make a ligature of baſs to prevent the ſlit of the ſtock from opening; then the whole ſhould be clayed over, to prevent the air from penetrating the ſlit, ſo as to deſtroy the grafts; only leaving two eyes of the cions above the clay for ſhooting.

Whip GRAFTING, alſo called tongue-grafting, is moſt commonly practiſed of any by the nurſerymen near London, eſpecially for ſmall ſtocks, becauſe the cions much ſooner cover the ſtocks in this method than in any other. This is performed by cutting off the heads of the ſtocks ſloping; there muſt then be a notch made in the ſlope toward the upper part downwards, a little more than half an inch deep, to receive the cion, which muſt be cut with a ſlope upward, and a part left in this ſlope like a tongue; which tongue muſt be inſerted into the ſlit made in the ſlope of the ſtock, ſo as that the two rinds of both cion and ſtock may be equal and join together exactly;

then there ſhould be a ligature of baſs to faſten the cion, ſo as that it may not be eaſily diſplaced; and afterwards clay it over, as in the former methods.

Root-**GRAFTING**, conſiſts in grafting a fine fruitful branch upon a root. The manner of performing it, is to take a graft of the tree you deſign to propagate, and a ſmall piece of the root of another tree of the ſame kind, or very near it, or pieces of roots cut from ſuch tree as you tranſplant, and whip-graft them, binding them well together. This tree may be planted where you would have it ſtand, for the piece of root will draw ſap and feed the graft, as the ſtock does in the other methods.

GRAFTING *by approach.* See INARCHING.

Eſcutcheon **GRAFTING**. See the article INOCULATION.

GRAIES, a market-town of Eſſex, ſituated on the river Thames, ſeventeen miles eaſt of London.

GRAIN, all ſorts of corn, as wheat, barley, oats, rye, *&c.* See the articles CORN, WHEAT, *&c.*

GRAIN is alſo the name of a ſmall weight, the twentieth part of a ſcruple in apothecaries weight, and the twenty-fourth of a penny-weight troy. See the article WEIGHT.

A grain-weight of gold-bullion is worth two-pence, and that of ſilver but half a farthing.

GRAIN alſo denotes the component particles of ſtones and metals, the veins of wood, *&c.* Hence croſs-grained, or againſt the grain, is contrary to the fibres of wood, *&c.*

GRAINING-BOARD, among curriers, an inſtrument called alſo a pummel, uſed to give a grain to their leather. See the article CURRYING.

GRAMEN, GRASS, in botany. See the article GRASS.

GRAMINEOUS HERBS, thoſe with narrow oblong leaves, without any pedicle.

GRAMMAR, γραμματικη, the art of ſpeaking and writing any language with propriety.

Grammar is uſually divided into four parts, orthography, etymology, ſyntax, and proſody. See ORTHOGRAPHY, *&c.*

Many are of opinion, that grammar is an art or ſcience antecedent to languages; which, according to them, ought to be accommodated to theſe original principles. But juſt the reverſe of this is true. Languages were by no means made for grammar, but that for them. It ſerves to teach languages to thoſe who are ignorant of them; and, therefore, ſhould be accommodated to the genius of each language in particular. In a philoſophical view, indeed, there are ſome circumſtances indifferently eſſential to them all; but this natural agreement is ſo much altered by the different cuſtoms of various languages, as to be for the moſt part utterly unknown. A juſt and exact method of grammar, therefore, can be only that, which, ſuppoſing a language introduced by cuſtom, without attempting any alteration in it, furniſhes certain obſervations called rules, to which the methods of ſpeaking uſed in this language, may be reduced; and this collection of rules is what is called grammar.

Grammar, ſays lord Bacon, is of two kinds; the one having relation to ſpeaking, the other to writing: for, as Ariſtotle well obſerved, words are the ſigns or marks of thoughts, and letters of words. See the articles LANGUAGE, LETTER, WORD, *&c.*

According to the ſame noble author, grammar holds the place of a conductor, in reſpect of the other ſciences; and tho' the office be not noble, it is extremely neceſſary; eſpecially as the ſciences, in our times, are chiefly derived from the learned languages. It is of leſs uſe in maternal languages, than in learning the foreign ones; but is moſt of all ſerviceable in the dead ones, or ſuch as are only preſerved in books.

Philoſophical **GRAMMAR**, one propoſed by lord Bacon, not upon any analogy which words bear to each other, but ſuch as ſhould diligently examine the analogy or relation betwixt words and things. He diſapproves of too curious an enquiry about the impoſition and original etymology of names. This he thinks an elegant, and as it were a waxen ſubject, that may be handſomely wrought and twiſted, but is attended with little truth and advantage. But, ſays he, it would be a noble kind of grammar, if any one, well verſed in languages, both the learned and vulgar, ſhould treat of their various properties; ſhewing wherein each of them excelled, and fell ſhort: for thus languages might be enriched by mutual commerce; and one beautiful image of ſpeech, or one grand model of language, for juſtly expreſſing the ſenſe of mankind, formed, like the Venus of Apelles, from the excellencies of ſeveral.

And thus, at the ſame time, we ſhould have ſome conſiderable marks of the genius and manners of people and nations, from their reſpective languages. See farther remarks on this ſubject in Bacon's Doctrine of Delivery, Sect. 7.

Grammar is alſo uſed for a book containing the rules of this art, methodically digeſted; of which there are multitudes indeed, but few good ones.

Grammar is likewiſe uſed in a ſynonymous ſenſe with elements, as a geographical grammar, *&c.*

GRAMMARIAN, one that is ſkilled in, or teaches grammar.

Antiently the name grammarian was a title of honour, literature, and erudition; being given to perſons accounted learned in any art or faculty whatever. But it is otherwiſe now, being frequently uſed as a term of reproach, to ſignify a dry plodding perſon, employed about words and phraſes, but inattentive to the true beauties of expreſſion and delicacy of ſentiment. The antient grammarians, called alſo philologers, muſt not be confounded with the grammatiſts, whoſe ſole buſineſs was to teach children the firſt elements of language. Varro, Cicero, Meſſala, and even Julius Cæſar, thought it no diſhonour to be ranked among grammarians, who had many privileges granted to them by the roman emperors.

GRAMMATICAL, in general, ſomething belonging to grammar. See the article Grammar.

GRAMMONT, a town of the auſtrian Netherlands, in the province of Flanders, ſituated on the river Dender: eaſt long. 3° 50′, and north lat. 50° 55′.

GRAMPOUND, a borough-town of Cornwall, thirty-eight miles ſouth-weſt of Launceſton; weſt long. 5° 25′, and north lat. 50° 20′.

It ſends two members to parliament.

GRAMPUS, in ichthyology, the engliſh name of a fiſh of the dolphin kind, with the ſnout turning upwards, and broad ſerrated teeth. See Delphinus.

GRAN, a city of lower Hungary, ſituated on the Danube: eaſt long. 18° 40′, north lat. 48°.

GRANA regia and **tiglia**, in the materia medica, names by which the purging grains or ſeeds of ricinus are called. They are violent and dangerous purgatives, preſcribed in the Indies in rheumatiſms and dropſies; but whilſt ſafer and equally efficacious medicines may be had there is no neceſſity to have recourſe to theſe.

GRANADA, a province of Spain, bounded by Andaluſia on the north, by Murſia and the Mediterranean on the eaſt, by the ſame ſea on the ſouth, and by Andaluſia on the weſt.

Granada, the capital city of the province of Granada, in Spain, ſituated two hundred miles ſouth of Madrid: weſt long. 3° 40′, and north lat. 37° 15′.

Granada, a province of terra firma, in ſouth America, bounded on the north by the provinces of Carthagena and St. Martha, on the eaſt by Venezuela, by Popoyan on the ſouth, and by Darien on the weſt.

Granada, a city of Mexico, in north America, ſituated on the ſide of the lake Nicaragua: weſt long. 89°, and north lat. 11° 8′.

Granada is alſo the moſt ſoutherly of the Caribbee-iſlands, ſituated one hundred and fifty miles ſouth-weſt of Barbadoes: weſt long. 61° 30′, and north lat. 12° 15′.

GRANADIER, a ſoldier armed with a ſword, a firelock, a bayonet, and a pouch full of hand-granadoes. They wear high caps, are generally the talleſt and briſkeſt fellows, and are always the firſt upon all attacks.

Every battalion of foot has generally a company of grenadiers belonging to it, or elſe four or five grenadiers belong to each company of the battalion; which, on occaſion, are drawn out, and form a company of themſelves. Theſe always take the right of the battalion.

Horſe-**Grenadiers**, called by the French *grenadiers volans*, or flying-grenadiers, are ſuch as are mounted on horſeback, and fight on foot: their exerciſe is the ſame with the other grenadiers.

GRANADILLOS, ſome of the Caribbee-iſlands, ſituated between the iſland of St. Vincent and Granada; but ſo inconſiderable that no nation has thought them worth poſſeſſing.

GRANADO, a hollow ball or ſhell, of iron or other metal, about two inches and a half in diameter; which being filled with fine powder, is ſet on fire by means of a ſmall fuſee faſtened to the touch-hole, made of the ſame compoſition as that of a bomb: as ſoon as the fire enters the ſhell, it burſts into many pieces, much to the damage of all that ſtand near. See the article Bomb.

Thuanus obſerves, that the firſt time granadoes were uſed, was at the ſiege of Wachtendonck, a town near Gueldres: and that the inventor was an inhabitant of Venlo, who, in making an experiment thereof, occaſioned two thirds of that city to be burnt, the fire being kindled by the fall of a granado.

GRANARY, a building to lay or ſtore corn in, eſpecially that deſigned to be kept a conſiderable time.

Sir Henry Wotton adviſes to make it look towards the north, as much as may be, becauſe that quarter is the cooleſt and moſt temperate. Mr. Worlidge obſerves that the beſt granaries are built of brick, with quarters of timber wrought in the inſide, to which the boards may be nailed, with which the inſide of the granary muſt be lined ſo cloſe to the bricks, that there may not be any room left for vermine to ſhelter themſelves. There may be many ſtories one above another, which ſhould be near the one to the other; becauſe the ſhallower the corn lies, it is the better, and more eaſily turned.

Some have two granaries, one above the other, and fill the upper with wheat, or other corn; the upper one having a ſmall hole in the floor, by which the corn falls down into the lower one, like the ſand in an hour-glaſs; which, when it is all come down into the lower granary, is carried up again into the upper one; and by this means, is kept continually in motion, which is a good preſervative for the corn. A large granary, full of ſquare wooden pipes, may likewiſe ſerve to keep corn from heating.

In Kent, when corn is firſt brought into granaries, they lay it about half a foot thick, turn it twice a week, and once in that time ſcreen it, for the firſt two months; after which they lay it a foot thick for two months more, turning it once or twice a week, and ſcreening it proportionably according as the weather is moiſt or dry. After five or ſix months more, they lay it two feet thick, and turn it once a fortnight, ſcreening it once a month, as occaſion requires. After a year, they lay it two feet and a half, or three feet thick, and turn it once in three weeks or a month, ſcreening it proportionably. When it has lain two years or more, they turn it once in two months, and ſcreen it once a quarter. And in this manner they proceed, turning and ſcreening it at greater or ſmaller intervals, according as they find it in brightneſs, hardneſs, and drineſs; for the oftener the grain is turned, the better it proves. For this purpoſe, an empty ſpace, about a yard wide, is left on all ſides of the room, and another at ſix feet diſtance through the whole area, into which empty ſpaces they turn the corn, as often as neceſſary. See the article Corn.

Before the corn is brought into granaries it ought to be well cleaned from impurities, and thoroughly dried; for it is obſervable, that ſuch corn ſucceeds beſt.

In many parts of Africa, they preſerve corn in deep pits, made in dry ſandy ground, or even the ſolid rock: on the floor of theſe they lay a bed of ſtraw, then a ſtratum of corn; after that another bed of ſtraw, and then another of corn; and in this manner they proceed till the whole is filled up, taking care to place a layer of ſtraw between the corn and the ſides of the pit.

GRANATE, or Garnet, *granatus*, in natural hiſtory. See Garnet.

GRAND, a term borrowed from the french, of the ſame import with *great*.

Grand assise, in law, a writ to determine the right of property in a real action.

Grand cape, or Cape magnum. See Cape.

Grand days, are thoſe days in the ſeveral terms, which are ſolemnly kept in the inns of court and chancery, *viz.* candlemas-day, aſcenſion-day, St. John the Baptiſt, and All-ſaints-day.

Grand distress, a writ that lies in two caſes, either when a tenant or defendant is attached, and does not appear: or where he has appeared, if he afterwards makes default, in which caſe this proceſs lies inſtead of a petit cape; and thereby all the goods and chattels of the defendant may be diſtrained within the county. See the article Distress.

Grand Jury, is the jury who find bills of indictment before juſtices of peace and gaol-delivery, or of oyer and terminer, *&c.* againſt any offenders that may be tried for the fact.

GRANDE, a branch of the river Niger, in Africa, which diſcharges itſelf into the Atlantic ocean, in 15° weſt long. and 11° north lat.

Grande, is alſo a river of Braſil, in the province of Del Rey, in ſouth America, which diſcharges itſelf into the Atlantic ocean, in 51° weſt long. and 32° ſouth lat.

GRANDEE, a deſignation given to a nobleman of Spain or Portugal.

The grandees are ſuffered to be covered before the king, who treats them like princes, ſtiling them Illuſtrious, in his letters; and in ſpeaking to them, or of them, they are ſtyled Eminences.

GRANDENTZ, or GRAUDENTZ, a city of Poland, forty-two miles ſouth of Dantzick: eaſt longit. 19°, and north lat. 53° 30′.

GRANDPRE, a town of Champaign, in France, thirty miles eaſt of Rheims: eaſt long. 4° 56′, and north lat. 49° 18′.

GRANGE, a houſe or farm, not only furniſhed with neceſſary places for all manner of huſbandry, as ſtables for horſes, ſtalls for cattle, *&c.* but where there are granaries and barns for corn, hay-lofts, *&c.* And by the grant of a grange, ſuch places will paſs, without being particularly mentioned.

GRANICUS, a little river near the Helleſpont, in the leſſer Aſia, where Alexander fought the firſt battle with the forces of Darius.

GRANIFEROUS PODS, among herbaliſts, thoſe that bear ſmall ſeeds like grain.

GRANITE, *granita,* in natural hiſtory, a diſtinct genus of ſtones, compoſed of ſeparate and very large concretions rudely compacted together, of great hardneſs, giving fire with ſteel, not fermenting with acids, and ſlowly and imperfectly calcinable in a great fire.

Of this genus there are three ſpecies: 1. The hard white granite, with black ſpots, commonly called moor ſtone: this is a very valuable kind, conſiſting of a beautiful congeries of very variouſly conſtructed and differently coloured particles, not diffuſed among, or running into one another but each pure and diſtinct, though firmly adhering to whichever of the others it comes in contact with, and forming a very firm maſs: it is much uſed in London for the ſteps of public buildings, and on other occaſions where great ſtrength and hardneſs are required. 2. The hard red granite, variegated with black and white, and common in Egypt and Arabia. 3. The pale whitiſh granite, variegated with black and yellow. This is ſometimes found in ſtrata, but more frequently in looſe nodules, and is uſed for paving the ſtreets.

GRANIVOROUS, an appellation given to animals which feed on corn or ſeeds. Theſe are principally of the bird-kind.

GRANT, in law, a conveyance in writing of ſuch things as cannot paſs or be conveyed by word only; ſuch are rents, reverſions, ſervices, advowſons in groſs, tithes, *&c.* The perſon making ſuch a conveyance is called the grantor, and he to whom the grant is made, the grantee.

A grant has uſually the words *give and grant, &c.* which in a deed of what lies in grant, will amount either to a gift, grant, feoffment, or releaſe, *&c.* and accordingly may be pleaded: though to every good grant it is requiſite that there be a grantor, or perſon able to give; a grantee, capable of the thing granted; ſomething granted, as grantable; that it be done in the manner the law requires; and that there be an agreement to, and an acceptance of the grant by him to whom made, *&c.*

When perſons *non ſanæ memoriæ* make grants, they may be good as to themſelves, though voidable by their heirs, *&c.* and notwithſtanding infants and feme coverts are prohibited by law to be grantors, yet they may be grantees: however, an infant, when at his full age, may diſagree to his grant, and the huſband to that made to his wife. All grants are expounded according to the ſubſtance of the deed in a reaſonable ſenſe, and agreeable to the intent of the parties. In caſe a perſon grants a rent-charge out of land, and he has then nothing in the ſame, admitting he afterwards purchaſes the land, nevertheleſs the grant is void. And the law does not allow of grants of titles only, or imperfect intereſt, or of things that are merely future. Likewiſe grants may be void on account of uncertainty, impoſſibility, being againſt the law, *&c.*

GRANT *of the king* is good for himſelf and his ſucceſſors, though they are not named therein: but the king may not grant away an eſtate-tail in the crown.

A grant tending to a monopoly cannot be made by the king, to the detriment of the intereſt and liberty of the ſubject; neither can the king make a grant non obſtante any ſtatute, made or to be made; for if he does, any ſubſequent ſtatute prohibiting what is granted will be a revocation of the grant: yet there may be a non obſtante to a former grant made by the king, where he has been deceived in ſuch grant, as where it contains more than what was intended to be granted, or there is any deceit in the conſideration, *&c.* by which the firſt grant becomes void.

GRANTHAM, a borough-town of Lincolnſhire, twenty-two miles ſouth of Lincoln.

It ſends two members to parliament.

GRANVILLE, a port-town of Normandy,

Plate CXVIII

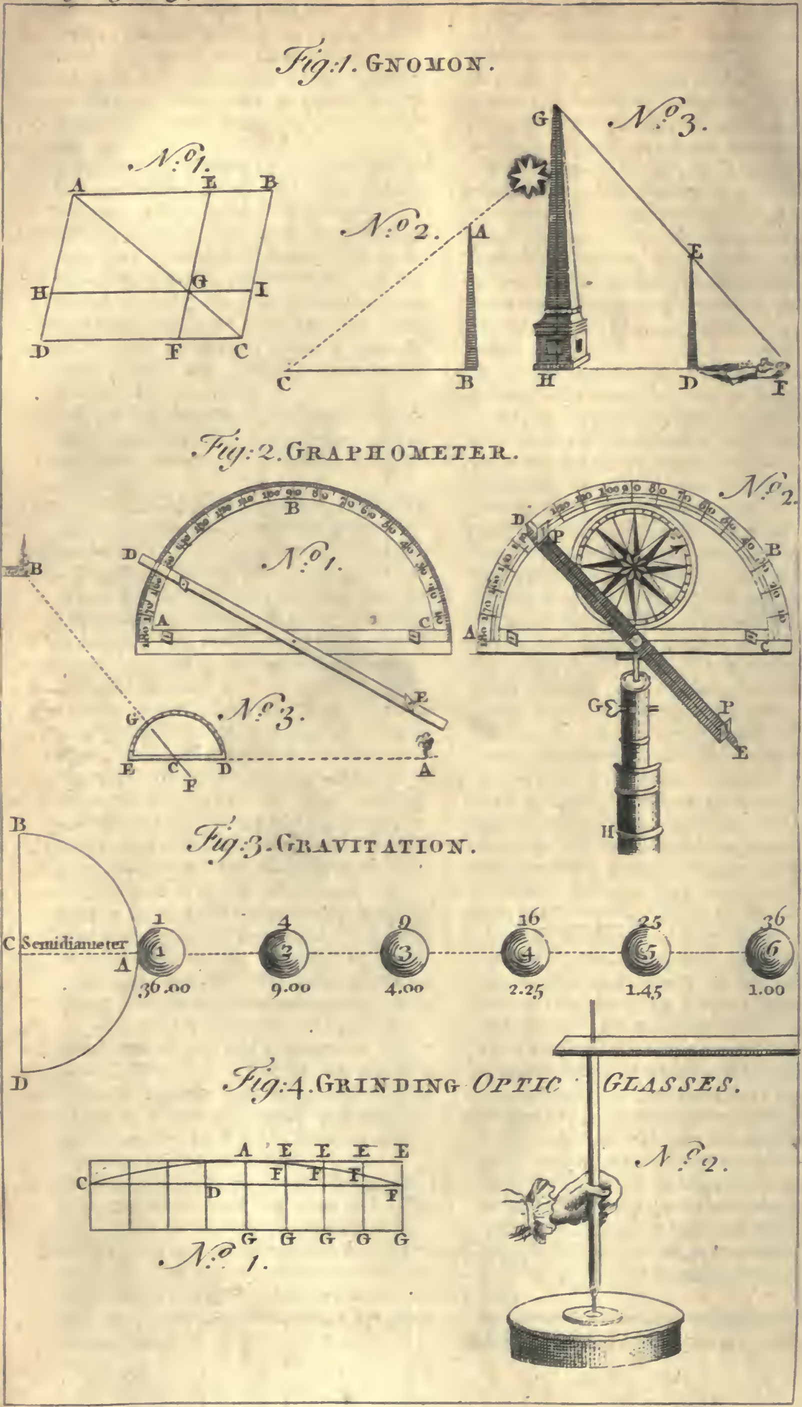


Fig: 1. GNOMON.

Fig: 2. GRAPHOMETER.

Fig: 3. GRAVITATION.

Fig: 4. GRINDING OPTIC GLASSES.

T. Jefferys Sculp.

dy, from whence the noble family of Carteret take the title of earl.

GRANULATED, ſomething that has undergone granulation. See the next article.

GRANULATION, according to Cramer, is the reducing metals to ſmall particles, in order to promote their fuſion and mixture with other bodies.

This is more coarſely done in the wet way, by means of running them into water through a new broom, or rolling them about in a hollow cylinder contrived on purpoſe: but the nicer and finer is the dry method, by means of a wooden box chalked within. Lead is very nicely granulated this way, and is to be done in the following manner.

Put a quantity of lead into an iron-ladle, and melt it ſlowly over a gentle fire; ſo ſoon as it is perfectly liquid, pour it into a round wooden box, with a wooden cover nicely fitted to it; and let both that and the cavity of the box be well rubbed over with chalk: ſhut the box immediately when the melted lead is in, and ſhake it violently, ſo that the metal within may be agitated forcibly againſt all parts of the box. Continue this agitation till the metal is cold, and on opening the box, you may find the greateſt part of it finely granulated, or comminuted into very ſmall porous grains. Let the chalk that adheres to theſe grains be rubbed off, and then ſift them, to make them of an equal ſize.

Lead, tin, and braſs are the moſt proper metals for this proceſs, ſince theſe, when ready to melt, are always extremely brittle, ſomewhat like wetted ſand. This ſort of granulation, therefore, cannot be obtained from ſuch metals as are the more tenacious the nearer they come to fuſion, as gold, ſilver, *&c.* for which reaſon theſe can only be granulated the other and coarſer way, by means of water.

GRANULOSE ROOTS, thoſe compoſed of ſmall knobs, like grains of corn.

GRAPE, the fruit of the vine, *vitis.* See the article VINE.

Thoſe kind of grapes which are thin-ſkinned, grow ſooner ripe than others, and will thrive in a temperate climate, where the others will not. If it happen that grapes are ſtruck with hail at the time that they are large and near ripening, they never become ripe at all, but harden, and ſo remain. See WINE.

The beſt ſort of grapes are the white and ſweet grapes with a tender ſkin, and without ſtones. It is ſaid, that this fruit, when ripe, is of an hot and moiſt nature, very fattening, refreſhing an inflamed liver, provoking urine, and good for the ſtomach; yet being windy, they diſturb the entrails, ſo that they are beſt eaten before meals, or elſe with pomegranates, and other ſharp fruit: but if for a few days they are hung up, they will loſe their windineſs and become better. See the article RAISINS.

The juice of the agreſtæ, or unripe wild grapes, is the omphacinum of the antients, as their oleum omphacinum was the expreſſed oil from the unripe olives. They uſed to expoſe the grapes to the ſun for ſome days, and then preſs out their juice into large vats: and in the time of Dioſcorides, they uſed to let it ſtand open in them, expoſed to the ſun, till moſt of the humidity was exhaled, and the remainder inſpiſſated into a rob, a form much uſed among the antients. This is reckoned a cooler, but has no place in our preſent pharmacy.

GRAPHOMETER, a mathematical inſtrument, otherwiſe called a ſemi-circle, the uſe of which is to obſerve any angle, whoſe vertex is at the center of the inſtrument in any plane (though it is moſt commonly horizontal, or nearly ſo) and to find how many degrees it contains.

The graphometer is a graduated ſemi-circle A B C, made of wood, braſs, or the like, and ſo fixed on a fulcrum G H, by means of a braſs-ball and ſocket, that it eaſily turns about, and retains any ſituation. It has two ſights fixed on its diameter A C, and at the center there is commonly a magnetical needle and compaſs in a box. There is likewiſe a moveable ruler, or index E D, with two ſights P, P; which turns round the center, and retains any ſituation given it. See plate CXVIII. fig. 2. n° 1. and 2.

To meaſure by this inſtrument any angle A C B (*ibid.* n° 3.) in any plane, and comprehended between the right lines A C and B C, drawn from two points A and B, to the place of ſtation C. Let the graphometer be placed at C, ſupported by its fulcrum; and let the immoveable ſights on the diameter of the inſtrument D E, be directed towards the point A; and likewiſe while the inſtrument remains immoveable, let the ſights of the ruler F G, which is moveable about the center C, be directed to the point B. Now it is evident, that the moveable ruler cuts off an arch D H, which is the meaſure of the angle A C B, ſought. Moreover, by the ſame method, the inclination of D E, or of F G, may be obſerved with the meridian line, which is pointed out by the magnetic needle incloſed in the box, and moveable about the center of the inſtrument.

GRAPTOLITHUS, in natural hiſtory, a name given by Linnæus to a kind of ſtone, reſembling a geographical map, found in Scandinavia.

GRAPNELS, a ſort of anchors with four flooks, ſerving for boats to ride by.

There is alſo a kind called fire and chain-grapnels, made with four barbed claws inſtead of flooks, and uſed to catch hold of the enemies rigging, or any other part, in order for boarding them. See plate CXXI. fig. 1.

GRASS, *gramen*, in botany, *&c.* a name given to ſeveral diſtinct plants, as the agroſtis or couch-graſs, the briza or quacking-graſs, *&c.* Under the term graſs are alſo comprehended all manner of herbaceous plants ſerving for the food of cattle, as clover, rye-graſs, *&c.*

The beſt ſeaſon for ſowing graſs-ſeed is the latter end of Auguſt and the beginning of September, that the graſs may be well rooted before the froſt ſets in, which is apt to turn the plants out of the ground when not well rooted. This ſeed ſhould be ſown in moiſt weather, or when there is a proſpect of ſhowers; but where this cannot be performed in autumn, the ſeeds may be ſown in the ſpring, about the latter end of March, if the ſeaſon proves favourable.

Some people mix clover and rye-graſs ſeeds together, allowing ten pounds of clover and one buſhel of rye-graſs to an acre; but this is only to be done where the land is deſigned to remain but three or four years in paſture, becauſe neither of theſe kinds are of long duration; ſo that where the land is deſigned to be laid down for many years, it will be proper to ſow with the graſs-ſeeds ſome white trefoil, or dutch clover, which is an abiding plant, and ſpreads cloſe to the ſurface of the ground, ſending forth roots at every joint, and makes the cloſeſt ſward of any, and is the ſweeteſt food for cattle: ſix or eight pounds of this ſeed ſhould always be ſown upon each acre.

The land on which graſs-ſeed is intended to be ſown, ſhould be well plowed, and cleared from the roots of noxious weeds, ſuch as couch-graſs, fern, ruſhes, heath, gorſe, broom, reſt harrow, *&c.* which if left in the ground, will ſoon get the better of the graſs, and over-run the land. Therefore, where any of theſe weeds abound, it will be a good method to plow up the ſurface in April, and let it lie ſome time to dry; then lay it in ſmall heaps, and burn it: the aſhes ſo produced will be a good manure for it. But where couch-graſs, fern, or reſt-harrow grow thick, and their roots run far under ground, the land ſhould be plowed two or three times pretty deep in dry weather, and the roots carefully harrowed off after each plowing, which is the moſt certain method of deſtroying them.

Before the ſeed is ſown, the ſurface of the ground ſhould be made level and fine, otherwiſe the ſeed will be buried unequally. The quantity of graſs-ſeed for an acre of land is uſually three buſhels, if the ſeed be clean; otherwiſe a much greater quantity muſt be allowed: when the ſeed is ſown it muſt be gently harrowed in, and the ground rolled with a wooden roller, which will make the ſurface even, and prevent the ſeeds being blown in patches. If, when the graſs comes up, there ſhould be any bare ſpots where the ſeed has not grown, they may be ſown again, and the ground rolled, which will fix the ſeeds, and the firſt kindly ſhowers will bring up the graſs.

If any thiſtles, ragwort, or ſuch other troubleſome weeds in the following ſpring come up among the graſs, they ſhould be carefully cut up with a ſpaddle before they grow too large; and this ſhould be repeated two or three times in the ſummer, which will effectually deſtroy them.

As to graſs-plats and green walks, they are made, for the moſt part, not by ſowing graſs-ſeed, but by laying turfs: and indeed the turfs from a fine common or down, are much preferable to ſown graſs: but if walks or plats are to be made by ſowing, the beſt way is to procure the ſeed from thoſe paſtures where the graſs is naturally fine and clear, or elſe the trouble of keeping it from ſpiry or benty graſs will be very great, and it will ſcarce ever look handſome.

In order to ſow graſs-walks, the ground muſt be firſt dug; and when it has been firſt dreſſed and laid even, it muſt be very carefully raked over, and all the clods and ſtones taken off and then covered over an inch thick with good mould. This being done, the ſeed is to be ſown pretty thick, that it may come up cloſe and ſhort; it muſt then be raked over again, to cover the ſeed, that if the weather ſhould happen to be windy it may not be blown away. It ought alſo to be obſerved, that where graſs is ſown in gardens, either for lawns or walks, there ſhould always be a good quantity of the white trefoil or dutch clover ſown with it; for this will make a fine turf much ſooner than any other ſown graſs, and will continue a better verdure than any other of the graſs-tribe.

In order to keep graſs plats or walks handſome, and in good order, you may ſow in autumn freſh ſeed over any places that are not well filled, or where the graſs is dead but nothing improves graſs ſo much as mowing and conſtant rolling.

When turf is laid in gardens, it is a general practice to cover the ſurface of the ground under the turf, either with ſand or very poor earth: the deſign of this is, to keep the graſs fine, by preventing its growing too rank. This is proper enough for very rich ground, but it is not ſo for ſuch land as is but middling, or poor; for when this is practiſed in ſuch places, the graſs will ſoon wear out and decay in patches.

When turf is taken from a common or down, ſuch ought to be choſen as is free from weeds: and when it is deſigned to remain for years without renewing, a dreſſing ſhould be laid upon it every other year, either of very rotten dung, aſhes, or where it can be eaſily procured, very rotten tan; but theſe dreſſings ſhould be laid on early in the winter, that the rain may waſh them into the ground, otherwiſe they will occaſion the graſs to burn, when the warmth of the ſummer begins. Where graſs is ſo dreſſed, and kept well rolled and mowed, it may be kept very beautiful for many years; but where it is not dreſſed, or fed with ſheep, it will rarely continue handſome more than eight or ten years.

GRASSHOPPER, in zoology, a ſpecies of gryllus, frequent in paſtures. See the article GRYLLUS.

Theſe inſects ſometimes infeſt particular places in prodigious ſwarms, and eat up the whole fruits of the earth, like the devouring locuſts. See LOCUST.

GRATIAS A DIOS, a cape or promontory of the province of Honduras, in Mexico: weſt long. 84°, north latitude 14° 30′.

GRATINGS, in a ſhip, a kind of lettice-work formed of ledges and battins, the ſquare holes of which being three or four inches wide, are for the current footing of men over hatch-ways, to give air below, and vent for the ſmoke in an engagement.

GRATIOLA, HEDGE-HYSSOP, in botany, a genus of the diandria monogynia claſs of plants, the flower of which is monopetalous and ringent; its tube is longer than the cup, and of an angular figure, and the limb is ſmall, and divided into four parts: the fruit is an oval pointed capſule, compoſed of two valves, and containing two cells; in which are included numerous ſmall ſeeds. Some erroneouſly confound it with the digitalis, or fox-glove. See DIGITALIS.

It is good in dropſies, jaundices, and other chronic complaints, taken in infuſion; and though a rough and violent medicine, operating both by vomit and ſtool, is reckoned a very powerful one.

GRATIOSA, one of the Azores-iſlands: weſt long. 29°, and north lat. 39°.

GRATZ, a city of Germany, and capital of the dutchy of Stiria, ſixty-five miles ſouth of Vienna: eaſt long. 15° 55′, and north lat. 47° 20′.

GRAVE, in muſic, is applied to a ſound, which is of a low or deep tune. See the article TUNE.

The thicker the cord or ſtring, the more grave is the note or tone; and the ſmaller, the more acute. The gravity of ſounds depends on the ſlowneſs of the vibratory motions of the chord; and their acuteneſs, on its quick vibrations.

Grave, in the italian muſic, denotes a very grave and ſlow motion, ſomewhat faſter than adagio, and ſlower than largo.

GRAVE ACCENT, in grammar, ſhews that the voice is to be lowered: its mark ſtands thus `. See the article ACCENT.

GRAVE alſo denotes a tomb, or ſepulchre, wherein the dead are buried.

GRAVE, in geography, a ſtrong city of the Netherlands, in the province of dutch Brabant, eight miles ſouth of Nimeguen: eaſt longitude 5° 45′, and north latitude 51° 50′.

GRAVEDO, in medicine, a heavineſs and pain in the head, which always accompanies a catarrh. See CATARRH.

This word, ſtrictly ſpeaking, ſignifies a catarrhal affection, in which there is no actual excretion of a ſerous matter, but only a congeſtion of it, with ſtagnation. It is frequently underſtood in the ſame ſenſe with coryza. See CORYZA.

The ſigns of a gravedo are a dizzineſs and heavineſs of the head, attended with tenſive and preſſing pains, which ſometimes becomes violently pungent and as it were burning, a remarkable turgeſcence of the veſſels, thirſt, and a dryneſs of the mouth, and unſound ſleep; and finally the breaſt is drawn into conſent, and is afflicted with a tenſive and oppreſſive pain.

The gravedo is a ſpecies or rather ſymptom of the head-ach, and conſequently is removed by the ſame means uſed againſt it. See the article HEAD-ACH.

GRAVEL, in natural hiſtory and gardening, a congeries of pebbles, which, mixed with a ſtiff loam, makes laſting and elegant gravel-walks; an ornament peculiar to our gardens, and which gives them the advantage over thoſe of other nations.

There are many different opinions about the choice of gravel; ſome are for having it as white as poſſible, and in order to make the walks more ſo, cauſe them to be rolled with ſtone-rollers, which are often hewn by the maſons ſo as to add a whiteneſs to the walks; but this renders them troubleſome to the eyes by their reflecting too ſtrongly the rays of light; this therefore ſhould be avoided, and ſuch gravel as will lie ſmooth, and reflect the leaſt, ſhould be preferred. Again, ſome ſcreen the gravel too fine, but this is an error; for if it be caſt into a round heap, and the great ſtones only are raked off, it will be the better. There are many kinds of gravel which do not bind, and by this means cauſe a continual trouble of rolling, to little or no purpoſe: as for ſuch, if the gravel be looſe or ſandy, you ſhould take one load of ſtrong loam and two of gravel, and ſo caſt them well together.

The month of March is the propereſt time for laying gravel; for it is not prudent to do it ſooner, or to lay walks in any of the winter-months before that time. In making theſe walks, great regard muſt be had to the level of the ground, ſo as to lay the walks with eaſy deſcents toward the low parts of the ground, that the wet may be eaſily drained off: but when the ground is level, it will be proper to have ſink-ſtones laid by the ſides of the walk, and at convenient diſtances, to let off the wet; and when the ground is naturally dry, the drains from the ſink-ſtones may be contrived ſo as to convey the water into ſeſſpools, from which the water will ſoak away in a ſhort time: but in wet lands there ſhould be under-ground drains, to convey the water off, either into ponds, ditches, or the neareſt place proper to receive it.

Some are apt to lay gravel-walks too round; but this is an error, becauſe they are not ſo good to walk upon; and beſides, it makes them look narrow; one inch is enough in a crown of five feet; and it will be ſufficient, if a walk be ten feet wide, that it lies two inches higher in the middle than it does on each ſide: if fifteen feet, three inches; if twenty feet, four inches; and ſo in proportion. For the depth of gravel-walks, ſix or eight inches may do well enough; and a foot in thickneſs will be ſufficient for any; but then there ſhould always be a depth of rubbiſh laid under the gravel, eſpecially if the ground be wet.

Some turn up gravel-walks into ridges in December, in order to kill the weeds: but this is very wrong, ſince it never anſwers the end, and therefore if conſtantly rolling them after rain and froſt will not effectually kill the weeds and moſs, you ſhould turn the walks in March, and lay them down at the ſame time.

In order to deſtroy worms that ſpoil the beauty of gravel or graſs-walks, ſome recommend the watering them by water made very bitter by walnut-tree leaves being ſteeped in it: but if in the firſt laying of the walks there be a good bed of lime-rubbiſh laid in the bottom, it will be the moſt effectual method to keep out the worms, for they do not care to harbour near lime.

GRAVEL, in medicine, a terrible diſtemper ariſing from a gritty matter concreting into ſmall ſtones in the bladder. See the article STONE.

GRAVELIN, a port-town of the french Netherlands, twelves miles ſouth-weſt of Dunkirk.

GRAVELLING, a misfortune that happens to a horſe by travelling, occaſioned by gravel-ſtones getting between the hoof and the ſhoe, which ſettling at the quick, there feſter and fret. It is cured by taking off the ſhoe, picking out all the gravel, and afterwards waſhing and cleanſing the part affected; which done, ſheep's tallow and bay-ſalt melted together, are to be poured hot upon it, and the ſhoe ſet on again; and at two or three dreſſings it will be healed.

GRAVELLY LAND, or ſoil, that abounding with gravel and ſand, which eaſily admits of heat and moiſture; and the more ſtony they are, the more barren they prove.

The beſt produce of theſe lands in corn, is rye, white oats, brank-turneps, *&c.* The natural produce in weeds, is quick-graſs, ſorrel, broom, furze, brakes, heath, *&c.* The beſt manure is marl, or any ſort of clay that will diſſolve with the froſt, cow-dung, chalk, mud, and half-rotten ſtraw from dunghills.

GRAVENEC, a town of Swabia, in Germany, thirty miles weſt of Ulm.

GRAVER, in the art of engraving, a tool by which all the lines, ſcratches, and ſhades are cut in copper, *&c.*

Gravers are of three ſorts, round-pointed, ſquare-pointed, and lozenge. The round are the beſt for ſcratching withal; the ſquare-pointed are for cutting the largeſt ſtrokes; and the lozenge-pointed ones for the moſt fine and delicate ſtrokes: but a graver of a middle form, between the ſquare and lozenge-pointed, will make the ſtrokes or hatches appear with more life and vigour.

The manner of making the gravers is as follows: provide ſome croſs bow ſteel, and procure it to be beaten out into ſmall rods, and ſoftened, and then, with a good file, ſhape them as you pleaſe. This being done, heat them red-hot, and then immediately dip them in ſoap, which will render them very hard. In doing this obſerve, that if you turn your hand never ſo little awry in dipping them into the ſoap, the graver will be crooked. If the graver prove too hard, lay the end of it upon red-hot charcoal, till it begin to grow yellowiſh, and afterwards dip it in tallow (or, as ſome ſay, in water) and it will toughen it. Then having ſharpened the graver upon an oil-ſtone, ſtrike the point of it into a piece of hard box-wood, to take off the roughneſs about the points which was cauſed by whetting it upon the ſtone. In the laſt place, touch the edge of the graver with a file; if it cuts, it is too ſoft, and will not work; but if it will not touch it, it is fit for the work. If the point of the graver breaks, it is a ſign that it is tempered too hard; but it will frequently, after a little uſe by whetting, come to be well conditioned.

GRAVESEND, a port-town of Kent, ſituated on the ſouthern ſhore of the river Thames, twenty miles eaſt of London.

GRAVINA, a city and biſhop's ſee of the kingdom of Naples, twenty-ſeven miles ſouth-weſt of Barri: eaſt long. 17°, and north lat. 41°.

GRAVING, or ENGRAVING. See the article ENGRAVING.

GRAVING, in the ſea-language, is bringing a ſhip a-ground, and then burning off with furze, reed, or broom, all the filth and foulneſs that ſticks to her bottom without board, in order to pay her a-new.

GRAVITATION, in phyſiology, a ſpecies of attraction, or the tendency of one body towards another, in conſequence of its gravity. See the article ATTRACTION and GRAVITY.

Cauſe of GRAVITATION. This indeed is ſo difficult to be accounted for, that Sir Iſaac Newton himſelf is cautious how he does it. At the cloſe of his Principia he tells us, that he has not hitherto aſſigned the cauſe of gravity, which is a power, however, that proceeds from a cauſe reaching even to the centers of the ſun and planets without loſing its virtue, and that acts, not according to the particles of the ſurface, like a mechanical cauſe, but according to the quantity of ſolid matter in bodies; its action being every way extended to immenſe diſtances, and always decreaſing in a duplicate proportion of them. The gravity of bodies towards the ſun, he further ſays, is compoſed of their gravity towards all its particles; and in going from the ſun, decreaſes exactly in a duplicate proportion of the diſtance to the orbit of ſaturn; and even the fartheſt aphelia of the comets, if thoſe aphelia are at reſt. But the reaſon of theſe properties of gravity, I could never hitherto, ſays Sir Iſaac, deduce from phænomena; and am unwilling to frame hypotheſes about them: for whatever is not deduced from phænomena, ought to be called an hypotheſes; and no ſort of hypotheſes are allowable in experimental philoſophy, wherein propoſitions are deduced from phænomena, and made general by induction. Thus the impenetrability, the mobility, the momentum of bodies, the laws of motion and gravity, were diſcovered; and it is enough that gravity has a real exiſtence, and acts according to ſuch laws as we have delivered, and that it ſuffices to produce all the motions of the celeſtial bodies, and of our ſea. See the articles PLANET MOON, *&c.*

Laws of GRAVITATION are as follows: 1. It is common to all bodies, and mutual between them. 2. It is proportional to the quantity of matter in bodies. 3. It is exerted every way from the center of the attracting bodies in right-lined directions. 4. It decreaſes as the ſquares of the diſtances increaſe: thus, if a body at A (plate CXVIII. fig. 3.) on the earth's ſurface, diſtant one ſemidiameter from the center C, weighs 36.00 pounds, it will, at the diſtance of 2, 3, 4, 5, 6, ſemidiameters, weigh 9.00, 4.00, 2.25, 1.45, 1.00 pounds, which numbers decreaſe as the ſquares of the diſtances increaſe. The truth of this propoſition is not to be had from experiments; the utmoſt diſtance we convey bodies to, from the ſurface of the earth, bearing no proportion to their diſtance from its center, but is ſufficiently clear from the motions obſerved by the heavenly bodies. See the articles CENTRAL FORCES, COPERNICAN SYSTEM, &c. Hence we learn, that all bodies have gravity, or are heavy, and that there is no ſuch thing as abſolute levity in nature: and by the ſecond law, the gravitation of all bodies is proportional to the quantity of matter they contain: and hence, ſince bodies of equal bulk are found to have unequal quantities of matter, it evidently follows, that a vacuum, or ſolid, void of matter, muſt neceſſarily exiſt, and that an abſolute plenum is a doctrine unphiloſophical, and equally falſe and abſurd. See the articles VACUUM and DENSITY.

Alſo from the third law it follows, that all bodies deſcending freely by their gravity, tend towards the earth in right lines perpendicular to its ſurface, and with equal velocities, abating for the reſiſtance of the air; as is evident from the ſecond law above. See the article DESCENT.

Again, ſince the gravitation is always as the quantity of matter, and inverſely as the ſquare of the diſtance, it follows that were the internal parts of the earth a perfect void, or hollow concavity, a body placed any where therein, would be abſolutely light, or void of gravity: but ſuppoſing the earth a ſolid body throughout, the gravitation from the ſurface to the center will decreaſe with the diſtance, or it will be directly proportional to the diſtance from the center.

Gravitation being found by many experiments and obſervations to affect all the matter of bodies equally, we have hence more reaſon, ſays Mr. Maclaurin, to conclude its univerſality, ſince it appears to be a power that acts not only at the ſurfaces of bodies, and on ſuch bodies as are removed at a diſtance from them, but to penetrate into their ſubſtances, and into that of all other bodies, even to their centers, to affect their internal parts with the ſame force as the external, to be obſtructed in its action by no intervening body or obſtacle, and to admit of no kind of variation in the ſame matter, but from its different diſtances only from that to which it gravitates.

This action of gravity on bodies ariſes from its action on their parts, and is the aggregate of theſe actions; ſo the gravitation of bodies muſt ariſe from the gravity of all their particles towards each other. The weight of a body towards the earth, ariſes from the gravity of the parts of that body: the gravity of a mountain towards the earth, ariſes from the gravitation of all the parts of the mountain towards it; the gravitation of the northern hemiſphere towards the ſouthern, ariſes from the gravitation of all its parts towards it; and if we ſuppoſe the earth divided into two unequal ſegments, the gravitation of the greater towards the leſſer, ariſes from the gravitation of all the parts of the greater towards the leſſer. In the ſame manner the gravity of the whole earth, one particle being excepted, toward that particle muſt ariſe from the quantity of gravitation of all the other particles of the earth towards that particle. Every particle, therefore, of the earth gravitates towards every other particle; and for the ſame reaſon every particle in the ſolar ſyſtem gravitates towards every other particle in it.

Center of GRAVITATION. See CENTER.

Line of GRAVITATION. See LINE.

Plane of GRAVITATION. See PLANE.

GRAVITY, in phyſiology, the natural tendency of bodies towards a center. See the article GRAVITATION.

From the two following obſervations we not only learn that gravity is univerſal and inſeparable from all matter; but that it is an active principle, and the moſt general for conſerving and recruiting motion.

Gravity, ſays Dr. Deſaguliers, may be looked upon as a property of matter, which, though not eſſential, is yet univerſal, and in one ſenſe inſeparable from it; that is, all parcels of matter, however modified, or all bodies, have a gravitation or attraction towards one another, as well in reſpect of the heavenly as of the terreſtrial bodies. The tendency of heavy bodies towards the center of the earth, being owing to the ſame cauſe that makes the ſun and planets tend towards one another.

The *vis inertiæ*, ſays Sir Iſaac Newton, is a paſſive principle by which moſt bodies perſiſt in their motion or reſt, receive motion in proportion to the force impreſſing it, and reſiſt as much as they are reſiſted. By this principle alone there never could have been any motion in the world; ſome other principal was neceſſary for putting bodies into motion; for, from the various compoſitions of two motions, it is certain that there is not always the ſame quantity of motion in the world. But by reaſon of the tenacity of fluids, the attrition of their parts, and the weakneſs of elaſticity in ſolids, motion is much more apt to be loſt than got, and is always upon the decay. There is therefore a neceſſity of conſerving and recruiting it, by active principles; and ſuch is the cauſe of gravity, by which the planets and comets keep their motion in their orbs, and bodies acquire great motion in falling, *&c.*

The ſame philoſopher obſerves, that bodies immerſed in fluids have two kinds of gravity, the one abſolute, and the other relative.

Abſolute gravity is the whole force wherewith a body tends downwards; for the laws of which, ſee ACCELERATION, DESCENT, and GRAVITATION.

Relative gravity is the exceſs of gravity whereby a body tends downwards more than the fluid which ſurrounds it.

By the former kind of theſe gravities, ſays the laſt-mentioned philoſopher, the parts of fluids and of all bodies gravitate in their proper places, and by their joint weights compoſe the weight of the whole. For every whole has weight, as is evident in veſſels filled with liquids; and the weight of the whole being equal to the weight of all the parts, muſt of neceſſity be compoſed of them. But bodies, by the latter kind of gravity, do not gravitate in their own places; that is, do not, when compared with one another, pregravitate; but mutually hindering each others endeavour to deſcend, they remain in their places as if they had no weight. Bodies in the air, which do not pregravitate, are thought by the vulgar not to be heavy, but thoſe which pregravitate they judge to be heavy, ſo far as the air does not ſupport them; ſo that the weight of bodies among the vulgar is only the exceſs of their real weight above that of the air. And therefore they call thoſe things light, which, being leſs heavy than the air, and yielding to its greater gravity, mount upwards. But theſe bodies are only comparatively light, not really ſo: for they will deſcend in vacuo. Thus bodies, which by reaſon of their greater or leſs gravity deſcend or aſcend in water, are but comparatively and apparently heavy or light, and their comparative and apparent levity is the exceſs or defect whereby their real gravity either exceeds or falls ſhort of the gravity of water. But whatever bodies neither deſcend by pregravitating, nor aſcend by yielding to one that pregravitates, though they ſtill by their real weights increaſe the weight of the whole, yet comparatively, and in a popular ſenſe, they do not weigh in water. Hence,

Specific GRAVITY, called alſo relative, comparative, and apparent gravity, is that by which one body is ſaid to be heavier or lighter than another of a different kind: thus lead is ſaid to be ſpecifically heavier than cork, becauſe, ſuppoſing an equal bulk of each, the one would be heavier than the other.

From hence it follows, that a body ſpecifically heavier than another, is alſo more denſe; that is, contains a greater quantity of matter under the ſame bulk, becauſe bodies weigh in proportion to the quantity of matter they contain.

If a ſolid be immerſed in a fluid of the ſame ſpecific gravity with itſelf, it will remain ſuſpended therein in whatever part of the fluid it is put; but if the body is ſpecifically heavier than the fluid, it will ſubſide to the bottom. On the contrary, if the body is ſpecifically lighter than the fluid, it will riſe to the top.

A body being laid on the ſurface of a fluid ſpecifically heavier than itſelf ſinks in it, till the immerſed part takes up the quantity of fluid, whoſe weight is equal to that of the whole body; and a body ſuſpended in a fluid ſpecifically lighter than itſelf, loſes a part of its weight equal to that of a quantity of the fluid of the ſame bulk. See the article FLUID.

For the method of finding the various comparative or ſpecific gravities of fluid and ſolid bodies to the laſt degree of accuracy, ſee the articles HYDROSTATICAL BALLANCE, and HYDROMETER.

We ſhall here ſubjoin a table of the ſpecific gravities of metals, minerals, ores, ſtones, foſſils, animal ſubſtances, vegetable ſubſtances, miſcellaneous ſubſtances, and fluids, conſidering rain-water as 1,000.

A Table of Specific GRAVITIES.

1. *Of Metals.*

Fine, or pure gold	19,640
Gold of a guinea of George II.	17,150
Gold of a moidore	17,140
Silver fine or pure	11,091
Silver of a ſhilling of George II.	10,000
Lead	11,325
Copper	9,000
Braſs caſt	7,850
wrought	8,000
Steel tempered	7,704
Iron	7,645
Tin	7,550

2. *Of mineral Ores, &c.*

Copper ore	3,775
Lead ore	6,800
Biſmuth	9,700
Turbith mineral	8,325
Antimony from Germany	4,000
from Hungary	4,700
Speltar	7,065

3. *Of Stones, Foſſils, &c.*

Adamant or diamond	3,500
A pſeudo-topaz	2,672
hyacinth	2,631
jaſper	2,666
A bohemian granate	4,360
A ſwediſh granate	3,978
Onyx ſtone	2,510
A cornelian	3.290
An engliſh agate	2,512
A turcois ſtone	2,508
Sardachates	3,595
A golden marcaſite	4,589
Rock cryſtal	2,659
Iceland cryſtal	2,720
Lapis nephriticus	2,894
lazuli	3,054
hæmatites	4,360
calaminaris	5,000
judaicus	2,500
manati	2,270
amianthus or aſbeſtos, from Wales	2,913
Ditto from Italy	2,360
Glaſs of the common ſort	2,666
Flint	2,542
Black italian marble	2,704
White italian ditto	2,707
A fine marble	2,700
Another ditto from Italy	2,718
A pellucid pebble	2,641
A ſelenitis	2,322
Mundic, or gold ſpar	4,430
Kidney ſtone	3,600
Blue ſtone	2,740
Star ſtone	3,450
Hard paving ſtone	2,460
Burford ſtone	2,049
Alabaſter	1,875
Rag ſtone	2,470
Rotten ſtone	1,980
Copperas ſtone	4,300
Chalk	2,370
Slate	2,740
Oil ſtone	2,380
A hone	2,388
China	2,270
Piece of brown ſtone bottle	1,777
Piece of white ſtone mug	2,250
Talc	2,65[illegible]
of Venice	2,780
of Jamaica	3,000
Armenian bole or earth	2,727
Common ſea coal	1,300
Magnet, or load-ſtone of Penſylvania	4,585
Piece of ſtonehenge very hard	2,618
ditto of a ſofter ſort	2,500
Briſtol ſtone	2,510

4. *Of Animal Subſtances.*

Bone of an ox	1,656
Ivory	1,826
The tip of a rhinoceros's horn	1,242
of an ox-horn	1,689
of a ſtag's horn	1,875
Calculus humanus	1,700
Ditto	1,240
Ditto	1,433
Ditto	1,660
Oyſter ſhell	2,892
Murex-ſhell	2,590
A cockle-ſhell	2,520
Mother of pearl	2,480
A piece of hard fiſh-ſkin	1,621
A piece of dried fleſh of fiſh	1,129
The quill part of a feather	1,330

5. *Of Vegetable Subſtances.*

Dry box-wood	1,030
oak	0,925
elm	0,600
Aſh, ſappy	0,734
Ditto more dry about the heart	0,845
Dry mapple	0,755
fir	0,546
cedar	0,600
walnut-tree	0,631
yew	0,760
Beech, meanly dried	0,854
Crab-tree, meanly dried	0,765

Lignum vitæ	1,327
nephriticum	1,200
aloes	1,177
brazilicum	1,030
rhodium	1,125
aſphaltum	1,179
guaiacum	1,337
Saſſafras wood	0,482
Red wood	1,031
ſantalum wood	1,128
White ditto	1,041
Citrine ditto	0,809
Speckled wood of Virginia	1,313
Maſtic wood	0,849
Ebony	1,177
Good wheat of the laſt year	0,757
Cork	0,240
White oats	0,472
Blue peaſe	0,795
White peaſe very dry	0,807
Barley of the laſt year	0,658
Malt made of the ſame	0,485
Field beans very dry	0,807
Wheaten meal unſifted	0,495
Rye meal unſifted	0,454
Wood aſhes	0,930

6. *Of Miſcellaneous Subſtances.*

Amber	1,040
Jet	1,238
Bezoar oriental	1,530
occidental	1,500
Sulphur common	1,800
vivum	2,000
Wood petrified	2,341
Borax	1,720
Coral, red	2,689
white	2,500
Corallachates	2,605
Cinnabar natural	7,300
artificial	8,200
of antimony	6,044
The reputed ſilver ore of Wales	7,464
The metal thence extracted	11,087
Ceruſe	3,156
Tartar crude	1,849
emetic	2,246
vitrioli	2,298
Cream of tartar	1,900
Camphire	0,996
Mercury crude	13,593
diſtilled once	13,570
ſublimed 511 times	14,110
Glaſs of antimony	5,280
Vitriol of Dantzick	1,715
Engliſh	1,880
white	1,900
Sal gemmæ	2,143
prunellæ	2,148
polycreſtum	2,141
Sal ammoniacum	1,453
Mirabile Glauberi	2,246
Salt of hartſhorn	1,496
Salt of vitriol	1,900
Alum	1,714
Nitre	1,900
Gum arabic	1,375
tragacanth	1,333
Myrrh	1,250
Verdigreaſe	1,714
Opium	1,363
Litharge of gold	6,000
of ſilver	6,044
Bees-wax, yellow	0,960
white	0,865
Pitch	1,150
Tutty	4,615
Honey	1,450
Roſin	1,100
Craſſamentum of the human blood	1,126
Serum of the human blood	1,030
Piece of petrified bone	1,895

7. *Of Fluids.*

Rain-water	1,000
Diſtilled water	0,993
Well or ſpring-water	0,999
River-water	1,009
Sea-water	1,030
Aqua fortis	1,300
regia	1,234
Oil of vitriol	1,700
cloves gilliflowers	1,034
amber	0,978
anniſeed	0,994
caraway-ſeed	0,940
linſeed	0,932
mint	0,975
Oil of olives	0,913
orange	0,888
origany	0,940
roſemary	0,934
ſaſſafras	1,094
ſpikenard	0,936
turpentine	0,792
Spirit of turpentine	0,874
wine rectified	0,866
Ethereal ſpirit of wine	0,732
Spirit of vitriol	1,203
amber	1,030
hartſhorn	1,073
urine	1,100
honey	0,895
nitre	1,315
ditto rectified	1,610
Sea-ſalt	1,130
tartar	1,073
Tincture of antimony	0,866
Butter of antimony	2,470
Balſam of Tolu	0,896

Lixivium

Lixivium of ſalt of tartar	1,550
Burgundy wine	0,953
Canary	1,033
Red-wine from Pontac	0,993
White-wine vinegar	1,011
Diſtilled vinegar	1,030
Milk of goats	1,009
Cow's milk	1,030
Urine	1,030

Since all bodies are ſubject to expand with heat, and be condenſed with cold, it will follow, that the ſpecific gravities of bodies cannot be preciſely the ſame in ſummer and winter. This was firſt obſerved in experiments by M. Homberg, and after him, by M. Eiſenchmid, who found the abſolute weight of a cubic inch of ſeveral ſorts of bodies in ſummer and winter, as in the table below.

	Summer.			Winter.		
	oz.	dr.	gr.	oz.	dr.	gr.
Brandy	0	4	32	0	4	42
Diſtilled water	0	5	8	0	5	11
Spring-water	0	5	11	0	5	14
River-water	0	5	10	0	5	13
Spirit of nitre	0	6	24	0	6	44
ſea-ſalt	0	5	49	0	5	55
vitriol	0	5	33	0	5	38
Oil of vitriol	0	7	59	0	7	71
Milk	0	5	20	0	5	25
Mercury	7	1	66	7	2	14
Vinegar	0	5	15	0	5	21
Ditto diſtilled	0	5	11	0	5	15

GRAVITY, in muſic, an affection of ſound, whereby it is denominated deep or low. See the article SOUND.

Gravity ſtands in oppoſition to acuteneſs, or that affection of ſound whereby it is denominated acute or ſhrill. See the article ACUTE.

The relation of gravity and acuteneſs is the principal thing concerned in muſic; the diſtinctneſs and determinateneſs of which relation gives the ſound the denomination of harmonical and muſical. The degrees of gravity, &c. depend on the nature of the ſonorous body itſelf, and the particular figure and quantity thereof. Though in ſome caſes on the part of the body where it is ſtruck.

Thus, *e. g.* the ſounds of two bells of different metals, of the ſame ſhape and dimenſions, being ſtruck in the ſame place will differ; and two bells of the ſame metal will differ in ſound, if they differ in ſhape and magnitude, or be ſtruck in different places: ſo in chords, all other things being equal, if they differ in tenſion, matter, or dimenſion, they will always differ in gravity. Thus again, the ſound of a piece of gold is much graver than that of a piece of ſilver of the ſame ſhape and dimenſions; and in this caſe the tones are, *cæteris paribus*, proportional to the ſpecific gravities: ſo a ſolid ſphere of braſs, two feet diameter, will ſound graver than another of one foot diameter; and here the ſounds are proportional to the quantities of the matter, or abſolute weights. But it muſt be obſerved, that acuteneſs and gravity, as alſo loudneſs and ſlowneſs are but relative things. We commonly call a ſound acute, or loud, in reſpect of another which is grave or low in reſpect of the former: ſo that the ſame ſound may be acute and grave, as alſo loud and low, in different compariſons.

The degrees of acuteneſs and gravity make the different tones of a voice or ſound; ſo we may ſay one ſound is in tune with another, when they are in the ſame degree of gravity.

The immediate cauſe or means of this diverſity lies deep. The modern muſicians fix it on the different velocities of the vibrations of the ſonorous bodies. If two or more ſounds are compared in relation of gravity, they are either equal or unequal in the degrees of tune: ſuch as are equal are called uniſons, and the unequal conſtitute what we call an interval in muſic. See the articles UNISON, and INTERVAL.

GRAVY, in cookery, the juice of dreſſed meat whether roaſted, fried or boiled.

Gravy is obtained from beef, mutton, veal, poultry, and even fiſh. The gravy of partridges, pullet, and other fowls, may be gotten by preſſing them when about half roaſted. The gravy of veal, beef, mutton, &c. is thus obtained: cut them in pieces, and putting them into an earthen pot, ſtop it cloſe by paſting the cover that no ſteam may get out; then ſet it on a gentle fire, for two hours, and the gravy will be made.

A fiſh gravy for ſoop may be made of tench or eels, cleaned, and put into a kettle with water, ſalt, a bunch of ſweet herbs, and an onion ſtuck with cloves: let theſe boil for an hour and half; and ſtraining off the liquor, thro' a clean linen cloth, add to it the peelings of muſhrooms, or muſhrooms themſelves cut ſmall: boil theſe together, and ſtrain the liquor into a ſtew-pan, upon fried flour, and a little lemon-juice. This may ſerve for a foundation to all fiſh-ſoups, and will keep good for ſome time.

GRAY, or GREY, in the manege, *&c.* See the article GREY.

GRAY, in zoology, an animal known among authors, by the name meles. See the article MELES.

GRAY, in geography a city of Franche Compte, in France, twenty-two miles north-weſt of Beſançon: eaſt long. 5° 32′, north lat. 47° 30′.

GRAYLING, in ichthyology, a ſpecies of coregonus, with the upper jaw longeſt, and with twenty-three bones in the back-fin. See the article COREGONUS.

GREASE, a ſwelling and gourdineſs of the legs of a horſe.

If the horſe be full of fleſh, the cure is to be begun by evacuation, ſuch as bleeding, purging, *&c.* and keeping his heels as clean as poſſible, by waſhing them with warm water and ſoap; for nothing promotes the greaſe more than negligence and naſtineſs. In general, turning out in the day-time, moderate exerciſe, a large and convenient ſtall, with good dreſſing, are the beſt remedies; but if the greaſe be got to a great height, and there is a nauſeous diſcharge, after cutting of the hair, and waſhing the heels with ſoap and water, bathe them with the following wound-water, pretty warm, twice a day, for three days. Take rock alum, and white vitriol, of each two ounces; powder them together, and burn them in a clean fire ſhovel, till they become a white calx: then take powdered camphire, one ounce; bole armenic in powder, two ounces; river or rain-water, two quarts. Make the water hot, and ſtir the other things into it. When you uſe it, it ſhould be ſhaken up, and a little of it warmed in a pot, and the ſores waſhed with a piece of ſpunge or rag.

GREASE, MOLTEN, a diſtemper incident to horſes, in which the fat is melted by over hard riding or labour. It may be known by the horſe's panting at the breaſt and girting-place, and heaving at the flank, which will be eaſily ſeen the night you bring him in, or the next morning.

For the cure, bleed him in the neck vein, to a good proportion; give him dried bran, and if he empties himſelf, a reſtringent glyſter; but forbear giving him any hot drugs.

GREASE, with hunters, the fat of a boar, or hare; but the former has commonly the word bevy added to it, and is called bevy-greaſe.

GREAT, a term of compariſon applied to things of extraordinary quantity or quality: thus, we ſay, a great city, a great genius, *&c.*

GREAT CIRCLES of the ſphere. See the article CIRCLE.

GREAT-CIRCLE SAILING, the manner of conducting a ſhip in, or rather pretty near the arch of a great circle, that paſſes thro' the zenith of the two places, *viz.* from whence ſhe came, and to which ſhe is bound. See the article SAILING.

GREAT MEN, in law books, ſignify the lords of parliament, or other perſons of note and diſtinction.

GREAT SEAL. See the article SEAL.

GREECE, the preſent Rumelia, and the antient Hellas, is ſituated between 20° and 26° eaſt long. and between 36° and and 41° north lat.

It reaches from the Adriatic Sea, eaſtward, to the Archipelago, and is generally a healthy and fruitful country.

GREEK, or GRECIAN, any thing belonging to antient Greece.

The greek language, as preſerved in the writings of the celebrated authors of antiquity, as Homer, Heſiod, Demoſthenes, Ariſtotle, Plato, Xenophon, *&c.* has a great variety of terms and expreſſions, ſuitable to the genius and occaſions of a polite and learned people, who had a taſte for arts and ſciences. In it, proper names are ſignificative; which is the reaſon that the modern languages borrow ſo many terms from it. When any new invention, inſtrument, machine, or the like, is diſcovered, recourſe is generally had to the Greek for a name to it; the facility wherewith words are there compounded, affording ſuch as will be expreſſive of its uſe: ſuch are barometer, hygrometer, microſcope, teleſcope, thermometer, *&c.* But of all ſciences, medicine moſt abounds with ſuch terms, as diaphoretic, diagnoſis diarrhœa, hemorrhage, hydrophobia, phthiſis, atrophy, *&c.* Beſides the copiouſneſs and ſignificancy of the Greek, wherein it excels moſt, if not all, other languages, it has alſo three numbers, *viz.* a ſingular, dual, and plural; alſo abundance of tenſes in its verbs, which makes a variety in diſcourſe,

courſe, prevents a certain drineſs that always accompanies too great an uniformity, and renders that language peculiarly proper for all kinds of verſe. The uſe of the participles of the aoriſt and preterit, together with the compound words already mentioned, give it a peculiar force and brevity without taking any thing from its perſpicuity.

It is no eaſy matter to aſſign the preciſe difference between the modern and antient Greek; which conſiſts in the terminations of the nouns, pronouns, verbs, *&c.* not unlike what obtains between ſome of the dialects of the Italian or Spaniſh. There are alſo in the modern Greek many new words, not to be met with in the antient. We may therefore diſtinguiſh three ages of the Greek tongue, the firſt of which ends at the time when Conſtantinople became the capital of the roman empire; the ſecond laſted from that period to the taking of Conſtantinople by the Turks; and the third, from that time to this.

GREEK BIBLE. See the article BIBLE.

GREEK CHURCH. See CHURCH.

GREEK MONKS and NUNS, of whatever order, conſider St. Baſil as their founder and common father, and eſteem it the higheſt crime to deviate in the leaſt from his conſtitutions. There are ſeveral beautiful convents with churches, in which the monks perform divine ſervice day and night. Some of the monks are cœnobites, or live together, wear the ſame habit, eat at the ſame table, and purſue the ſame exerciſes and employments: Theſe are of two ſorts; the one of the grand and angelical habit, being ſuch as profeſs to live more righteouſly than the reſt; the other of the leſſer habit, who do not pretend to lead ſuch ſanctified lives. Other monks again are anachorets. See the article ANACHORET.

GREEN, one of the original colours, excited by the rays of light. See COLOUR. Artificial greens, however, are rarely ſimple colours, but produced by the mixture of yellow and blue: thus, two powders, one blue and the other yellow, appear perfectly green when mixed; tho' if viewed with a microſcope, the mixture will be ſeen chequered yellow and blue. See YELLOW and BLUE.

The dyers make divers ſhades, or degrees, of green; all which are firſt dyed in blue, and then taken down with woad, verdigreaſe, *&c.* and afterwards greened with the weed, there being no one ingredient that will dye green alone. See the article DYEING.

GREEN, among painters. Gamboge will give five or ſix ſorts of green with verdigreaſe. But the yellow which ſome prefer before all others, is made of french berries; which is either deeper or fainter, according as the liquor is more or leſs ſtained by them. In like manner, a yellow, drawn from the roots of the barberry or mulberry, will anſwer the ſame purpoſe, being mixed with tranſparent verdigreaſe. As to verdigreaſe itſelf, it produces a fine bluiſh green, flows readily in the pencil, and may even ſerve as an ink to write with; but is ſubject to decay. Mountain-green is uſed for a graſs-colour. Verditer is a light green, ſeldom uſed but to colour landſkips that ſeem afar off. Sap-green is dark and dirty, and therefore never uſed but to ſhadow other greens in the darkeſt places. Copper green is an excellent tranſparent and ſhining graſs-green, if thickened in the ſun-ſhine, or over a gentle fire. It is the moſt uſed of any green in waſhing of prints or maps.

GREEN-CLOTH, a board or court of juſtice, held in the compting houſe of the king's houſhold, compoſed of the lord-ſteward, and officers under him, who ſit daily. To this court is committed the charge and overſight of the king's houſehold in matters of juſtice and government, with a power to correct all offenders, and to maintain the peace of the verge, or juriſdiction of the court royal; which is every way about two hundred yards from the laſt gate of the palace where his majeſty reſides.

It takes its name, board of green cloth, from a green cloth ſpread over the board where they ſit.

Without a warrant firſt obtained from this court, none of the king's ſervants can be arreſted for debt.

Clerks of the **GREEN CLOTH**, are two officers of the board of green-cloth who appoint the diet of the king and his houſehold, and keep all records, ledgers and papers relating thereto; make up bills, parcels and debentures for ſalaries, and proviſions and neceſſaries for the officers of the pantry, buttery, cellar, *&c.*

They alſo wait upon foreign princes when entertained by his majeſty.

GREEN-FINCH, in ornithology, the engliſh name of the greeniſh fringilla, with the wings and tail variegated with yellow. See the article FRINGILLA.

Fig: 1. The *GREEN*-FINCH.

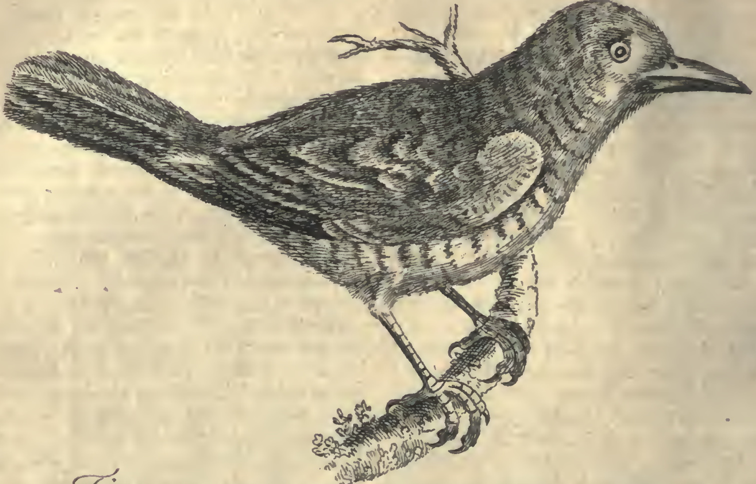


Fig: 2. The *RED-HEADED* GREEN-FINCH.

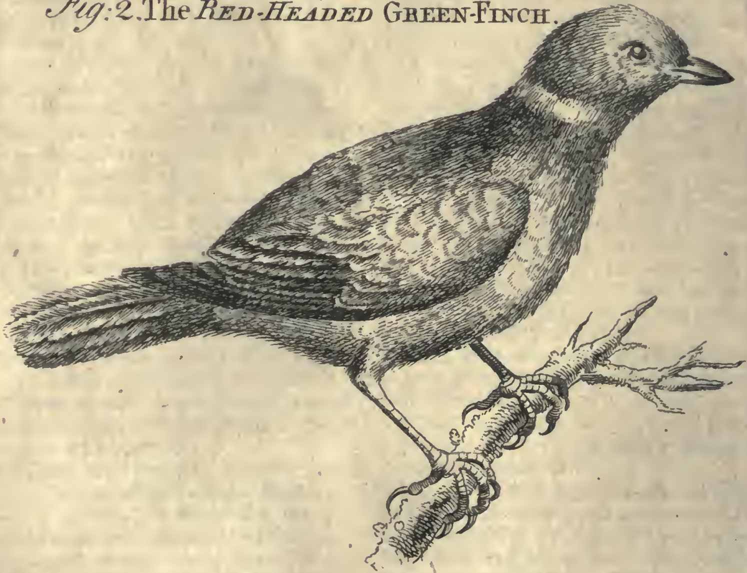


Fig: 3. GLYCYRRHIZA Liquorice.

T. Jefferys Sculp.

This bird is very frequent with us, and is a little larger than the chaffinch. See plate CXIX. fig. 1.

There is alſo a very beautiful green-finch brought from Surinam, with a red-head, and a roundiſh yellow ſpot near the joint of the wing. See *ibid.* fig. 2. where it is figured nearly of the bigneſs of life.

GREEN-HOUSE, or conſervatory, a houſe in a garden contrived for ſheltering and preſerving the moſt tender and curious exotic plants, which, in our climate, will not bear to be expoſed to the open air during the winter ſeaſon. Theſe are generally large and beautiful ſtructures, equally ornamental and uſeful. See plate CXX.

The length of theſe houſes, ſays Mr. Miller, muſt be proportioned to the number of plants they are to contain; but their depth ſhould never be greater than their height in the clear; which in ſmall or middling houſes may be ſixteen or eigtheen feet, and in large ones from twenty to twenty-four. The windows in front ſhould extend from about one foot and a half above the pavement, to within the ſame diſtance of the cieling, which will admit of a corniche round the building, over the heads of the windows. In a ſmall green-houſe, the ſaſhes ſhould not be leſs than four or five feet broad, and in a large one, they ought not to exceed ſeven and a half, the ſhutters of which ought to fall back cloſe to the piers on the inſide, that when open, they may not prevent any of the rays of light from reaching the plants. The piers between theſe windows, which ſupport the building, ſhould be as narrow as poſſible, for which reaſon they ſhould either be of ſtone or of well-burnt brick. If they are of ſtone, they ought not to exceed two feet and a half in front, and ſhould be ſloped off backward to about eighteen inches broad, by which means the rays of the ſun will not be obſtructed by the corners of the piers; which they would be, if they were ſquare: but if they are built with brick, it will be proper to make them near three feet in front, otherwiſe, they will be too weak to ſupport the building: theſe ought alſo to be ſloped off in the manner directed for thoſe of ſtone.

Over the green-houſe there may be rooms for drying and preſerving ſeeds, roots, &c. and behind it, there may be erected a houſe for tools and other purpoſes; which will prevent the froſt from entering that way; ſo that the wall between them need not be more than two bricks and a half in thickneſs.

The floor of the green-houſe, which ſhould be laid either with marble, common ſtone, or broad tiles, muſt be raiſed two feet above the ſurface of the ground on which the houſe is placed: or if the ſituation be moiſt, at leaſt three feet; and if the whole be arched with low brick arches under the floor, it will be of great ſervice in preventing the damps riſing in winter. Under the floor, about three feet from the front, it will be adviſeable to make a flue of about ten inches in width, and two feet deep, to be carried the whole length of the houſe, which may be returned along the back part, and the ſmoke be carried up into funnels adjoining to the tool houſe. The fire-place may be contrived at one end of the houſe; and the door at which the fuel is put in, as alſo the aſh-grate, may be contrived to enter into the tool-houſe, and the fuel being laid in the ſame place, the whole will be out of ſight. Fires, however, muſt be very ſparingly uſed in this place: not one winter in three or four will require them to be lighted, ſince this ought never to be done but when the froſt cannot well be kept out any other way, and when this is the caſe, this expedient may ſave a whole houſe of plants. Indeed the coldeſt weather cannot make it neceſſary for the green-houſe to be ſhut up cloſe for a long time together, which would be attended with very ill conſequences; for as it frequently happens, that in continued froſts, we have an hour or two of ſun-ſhine in the middle of the day, it will be of great ſervice to the plants if they are allowed to enjoy its rays thro' the glaſſes; but the window-ſhutters ſhould be cloſed again as ſoon as it is clouded. The inſide of the houſe ſhould either be white waſhed, or painted white; for this colour reflects the rays of light in a greater quantity than any other.

In this green-houſe there ſhould be truſſels, upon which rows of planks ſhould be fixed, in order to hold the pots or tubs of plants, the foremoſt of which ſhould be placed four feet from the window, and the rows behind ſhould riſe gradually from the firſt, in ſuch a manner, that the heads of the ſecond row be entirely advanced above the firſt, the ſtems only being hid by it: and at the backſide, there ſhould be allowed at leaſt a ſpace of five feet, for the conveniency of watering the plants, and admitting a current of air round them: care ſhould alſo be taken not to place the plants too cloſe to each other, nor ever to place euphorbiums, ſedums, torch thiſtles, and other tender ſucculent plants, amongſt oranges, myrtles, and other ever-greens. To avoid the inconvenience of placing plants of very different natures in the ſame houſe, it will be very proper to have two wings added to the main green-houſe, which, if placed in the manner of the annexed plan, will greatly add to the beauty of the building, and alſo collect a greater ſhare of heat. In this plan the green houſe is ſuppoſed exactly to front the ſouth, one of the wings to face the ſouth-eaſt, and the other the ſouth-weſt: ſo that from the time of the ſun's firſt appearance upon any part of the building, until it goes off at night, it will be conſtantly reflected from one part to the other, and the cold winds will be alſo kept off from the front of the main green-houſe. In the area may be placed many of the tender exotic plants, that will bear to be expoſed in the ſummer ſeaſon: and in the ſpring, before the weather will permit the plants to be ſet out, the beds and borders of this area may be full of anemonies, ranunculuſes, tulips, *&c.*

In the annexed plate, A is the ground plan of the green-houſe; B B the ground plan of the two ſtoves. C C C the ſheds behind the green-houſe and ſtoves. D D the paſſage of communication between the green houſe and ſtoves, where the ſtairs are placed which lead to the rooms over the green-houſe. E E the ſection of the flues in the back of the ſtoves, and F is the upright of the green houſe and ſtoves.

In the center of this area may be contrived a ſmall baſon for water, which will be very convenient for watering the plants; and the two wings of the buildings ſhould be ſo contrived as to maintain plants of different degrees of hardineſs, which ſhould be effected by the ſituation and extent of the fire-place, and the manner of conducting the flues. Theſe wings being, in the draught annexed, allowed ſixty feet in length, may be divided in the middle by partitions of glaſs, with glaſs-doors, and to each of theſe there ſhould be a fire-place, with flues carried up againſt the back-wall. The ſloping glaſſes of theſe houſes ſhould be made to ſlide and take off, ſo that they may be drawn down more or leſs in warm weather, to admit air to the plants; and the upright glaſſes in front may be ſo contrived, as that every other may open as doors upon hinges, and the alternate glaſſes may be divided into two, the upper part of each to be drawn down like ſaſhes, to let in the air.

If there are not ſheds running behind the whole length of theſe wings, the walls ſhould not be leſs than two bricks thick, and the back part having ſloping roofs covered with tiles or ſlates, ſhould be lined with reeds, *&c.* under the covering, in order to keep out the cold.

GREENLAND, or *Weſt* GREENLAND, extends from the meridian of London to 50° weſt longitude, and from 60° to 80° north latitude.

The Danes have ſome colonies here, and pretend to the property of the whole. However, the Dutch make very free with the fiſhery on this coaſt, notwithſtanding the repreſentations, and even menaces of the Danes on that head.

Eaſt GREENLAND, or GROENLAND. See the article GROENLAND.

GREENWICH, a town of Kent, ſituated on the ſouthern ſhore of the Thames, five miles eaſt of London; remarkable for its royal and magnificent hoſpital, erected for decayed or diſabled ſeamen, who have ſerved their country; and for its palace, and moſt delightful park. See the article HOSPITAL.

On the top of a ſteep hill in the park, ſtands the royal obſervatory, built by Charles II. and furniſhed with all manner of inſtruments for aſtronomical obſervations, and a deep dry well for obſerving the ſtars by day.

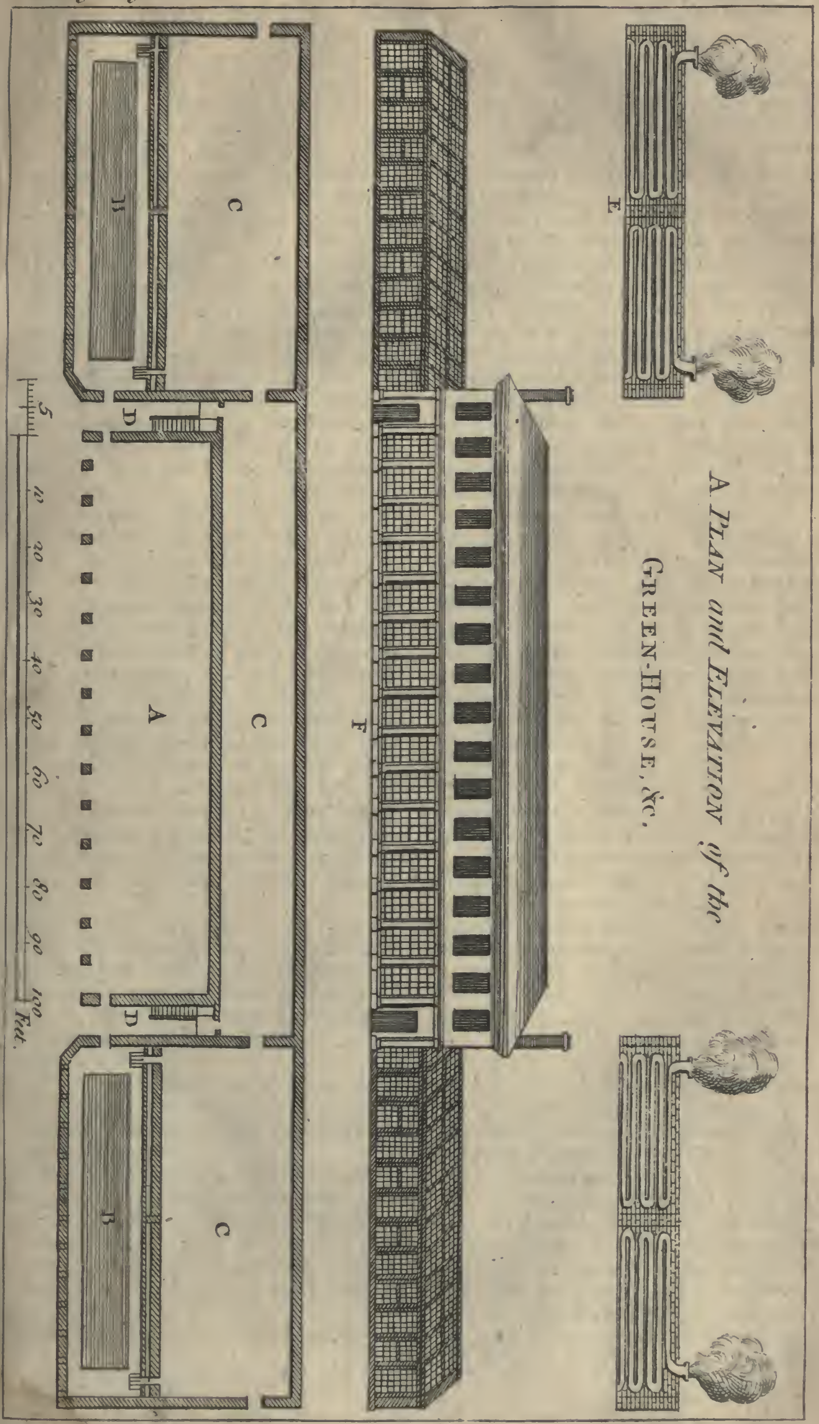
GREGARIOUS, among zoologiſts, a term applied to ſuch animals as do not live ſolitary, but in herds, flocks, or coveys.

GREGORIAN CALENDAR, that which ſhews the new and full moon, with the time of Eaſter, and the moveable feaſts depending thereon, by means of epacts, diſpoſed through the ſeveral months of the gregorian year. See CALENDAR and EPACT.

GREGORIAN CHANT. See the article CHANT.

GREGORIAN EPOCH, the epocha, or time whence the gregorian calendar or computation took place. The year 1754 is the 172 year of that epocha.

GREGORIAN YEAR, the Julian year corrected, or modelled, in ſuch a manner as



A *PLAN and ELEVATION of the* GREEN-HOUSE, &c.

T. Jefferys Sculp.

that three ſecular years, which in the Julian account are biſſextile, are here common years, and only every fourth ſecular year is made a biſſextile year. See the articles BISSEXTILE and YEAR.

The Julian computation is more than the ſolar year by eleven minutes, which in one hundred and thirty-one years amounts to a whole day. By this calculation, the vernal equinox was anticipated ten days from the time of the general council of Nice, held in the year 325 of the Chriſtian æra, to the time of pope Gregory XIII. who therefore cauſed ten days to be taken out of the month of October, in 1582, to make the equinox fall on the twenty-firſt of March, as it did at the time of that council, and to prevent the like variation for the future, he ordered that three days ſhould be abated in every four hundred years by reducing the leap year at the cloſe of each century for three ſucceſſive centuries to common years, and retaining the leap year at the cloſe of each fourth century only. See JULIAN and EQUINOX.

This was at that time eſteemed as exactly conformable to the true ſolar year, but it is found not to be ſtrictly juſt, becauſe that in four hundred years it gets one hour and twenty minutes, and conſequently in 7200 years, a whole day.

The greateſt part of Europe have long uſed the gregorian ſtyle: but Great Britain retained the julian till the year 1752, when by act of parliament this ſtyle was adjuſted to the gregorian; ſince which time Sweden, Denmark, and other european ſtates, who computed time by the julian account, have followed this example.

GRENADIER and GRENADO. See the articles GRANADIER and GRANADO.

GRENOBLE, a city of France, capital of Dauphiny, forty-five miles ſouth-eaſt of Lyons, and thirty-ſix miles ſouth weſt of Chamberry: eaſt longitude 5° 28′, north latitude 45° 12′.

GRENOCK, or GREENOCK, a port-town of Scotland, near the mouth of the river Clyde; being the principal ſtation for the herring fiſhery.

GRESHAM-COLLEGE. See COLLEGE.

GREVE, in our antient writers, a denomination of power and authority, ſignifying as much as *comes*, and *vice comes*, a ſheriff; and according to Lambert, it is the ſame with reve. See the articles COUNT and REVE.

GREWIA, in botany, a genus of the gynandria-polyandria claſs of plants, the corolla whereof conſiſts of five petals, of the form of the cup, but leſs, and emarginated at the baſe: the fruit is a quadrangular berry, containing four cells: the ſeeds are few, and of a globoſe figure.

GREWT, among miners, ſignifies earth of a different colour from the reſt, found on the banks of rivers as they are ſearching for mines.

GREY, or GRAY, a mixed colour partaking of the two extremes, black and white. See the article COLOUR.

To dye a ſilver GREY. Take water a ſufficient quantity; of galls bruiſed ſmall, two ounces; tartar bruiſed, three ounces; boil them, and enter twenty yards of ſtuff or cloth, *&c.* handle and boil an hour and a half; cool it; then put in copperas a ſufficient quantity; enter your cloth again at a boiling heat; handle it, boil a quarter of an hour, and ſo cool; if you would have it ſadder, put in more copperas. See COLOUR and DYEING.

To dye a light GREY *colour.* Take water a ſufficient quantity; nut galls bruiſed ſmall, four ounces; white tartar bruiſed ſmall, four ounces; make them boil, then enter twenty yards of broad-cloth, and handle it; boiling an hour and half, cool your cloth, and put in copperas an ounce and half; enter your cloth again, and handle it; boil it a quarter of an hour, and cool it; if you would have it ſadder, put in more copperas.

To dye a dark GREY. For every pound of woollen ware, uſe a quarter of a pound of copperas, and a quarter of a pound of brown wood, or walnut-tree-wood. To finiſh it, take two ounces of brown wood, and half an ounce of copperas.

To dye ſtuff, &c. a lavender GREY. Heat a proper quantity of clean rain water in a kettle, and for every pound of ſtuff, take an ounce of blue lac, beaten ſmall; and half an ounce of pounded galls, and the ſame quantity of vitriol: boil them together, and put in the ſtuffs; and boil them for half an hour. This dye is proper for ſlight ware, as ſtockings and coarſe ſtuffs, but not for the better ſort.

To dye ſilk a good GREY. This you may do as in the tawney dye, and after you have wrung out, rinſed, and beaten it, if it be browned, it becomes a good grey.

In the manege, they have ſeveral ſorts of greys, as the branded-grey, which has ſpots quite black diſperſed here and there; they have alſo the dapple-grey, the ſilver-grey, the iron-grey, *&c.*

Grey-hound. See the article Hound.

GRIFFON, in heraldry, an imaginary animal, feigned by the antients to be half eagle and half lion; by this form they intended to give an idea of ſtrength and ſwiftneſs joined together, with an extraordinary vigilance in guarding the things intruſted to its care. Thus the heathen naturaliſts perſuaded the ignorant, that gold mines were guarded by theſe creatures with incredible watchfulneſs and reſolution.

GRIG, a name given to the leſſer ammodytes, or ſand-eels. See Ammodytes.

GRILLADE, in cookery, meat broiled on a gridiron.

GRIMBERG, a town of the auſtrian Netherlands, in the province of Brabant, five miles north of Bruſſels: eaſt long. 4° 15′, north lat. 50° 55′.

GRIMPERG, a city of Germany, in the circle of the Lower Rhine, and earldom of Triers: eaſt longitude 6° 35′, north latitude 49° 40′.

GRIMSBY, a borough and port-town of Lincolnſhire, ſituated at the mouth of the Humber: eaſt long. 4′, north lat. 53° 34′. It ſends two members to parliament.

GRINDERS, *dentes molares*, in anatomy, *&c.* See Tooth and Molares.

GRINDING, *trituratio*, the reducing hard ſubſtances to fine powders, either by the mortar, or by way of levigation upon a marble.

Grinding has a great ſhare in ſome inſtances of raiſing or depreſſing the efficacy of what comes under its management: for in grinding, all thoſe bodies whoſe efficacy conſiſts in the peculiar ſhape and points of their components particles, the more and the finer they are broke, the leſs will they operate. Thus may calomel be rendered much gentler, and made capable of being given in much larger quantities, only by long rubbing in a glaſs mortar; for the continual triture has the ſame effect upon it, as repeated ſublimation, which is only breaking the ſaline ſpicula more and more, until it become almoſt plain mercury. But in reſinous ſubſtances, particularly purgative ones, as jalap, ſcammony, *&c.* the finer the powder they are reduced to, the greater is likely to be their efficacy: for as the ſenſe which the ſtomach and bowels have of them is in proportion to their contacts, therefore the more the quantity is divided, the farther will it diffuſe itſelf, and vellicate the fibres; that is, it will work the more.

Grinding is alſo the rubbing or the wearing off the irregular or otherwiſe redundant parts of the ſurface of a body, and reducing it to the deſtined figure, whether that be flat, concave, or the like.

Method of Grinding *optic glaſſes.* Mr. Huygens directs, in general, to make the breadth of the concave tool, plate, diſh, or form, in which an object-glaſs muſt be ground, almoſt three times the breadth of the glaſs. Though in another place he ſpeaks of grinding a glaſs whoſe focal diſtance was 200 feet, and breadth 8 $\frac{1}{2}$ inches, in a plate only fifteen inches broad. But for eye-glaſſes, and others of leſſer ſpheres, the tools muſt be broader in proportion to the breadth of theſe glaſſes, to afford room enough for the motion of the hand in poliſhing. Mr. Huygens made his tools of copper, or of caſt braſs, which, for fear they ſhould change their figure by bending, can hardly be caſt too thick: however, he found by experience, that a tool fourteen inches broad, and half an inch thick, was ſtrong enough for the forming glaſſes to a ſphere of thirty-ſix feet diameter; when the tool was ſtrongly cemented upon a cylindrical ſtone an inch thick, with hard cement made of pitch and aſhes.

In order to make moulds for caſting ſuch tools as are pretty much concave, he directs that wooden patterns ſhould be turned in a lathe, a little thicker and broader than the tools themſelves; but for tools that belong to ſpheres above twenty or thirty feet diameter, he ſays it is ſufficient to make uſe of flat boards turned circular to the breadth and thickneſs required. When the plates are caſt, they muſt be turned in a lathe exactly to the concavity required; and for this purpoſe it is requiſite to make a couple of braſs-gages in the manner following, according to the direction of Mr. Molyneux.

Take a wooden pole, a little longer than the radius of the ſpherical ſurface of the glaſs to be formed; and through the ends of it ſtrike two ſmall ſteel points, at a diſtance from each other equal to the radius of the ſphere intended; and by one of the points hang up the pole againſt a wall, ſo that this upper point may have a circular motion in a hole or ſocket made of braſs or iron, fixt firmly to the wall. Then take two equal plates of braſs or copper, well hammered and ſmoothed, whoſe length is ſomewhat more than the breadth of the tool of caſt braſs, whoſe thickneſs may be about a tenth or a twelfth of an inch, and whoſe breadth may be two or three inches. Then having faſtened theſe plates flat againſt the wall in a horizontal poſition, with the moveable point in the pole, ſtrike a true arch upon each of them. Then file away the braſs on one ſide exactly to the arch ſtruck, ſo as to make one of the braſs edges convex, and the other concave; and to make the arches correſpond more exactly, fix one of the plates flat upon a table, and grind the other againſt it with emery. Theſe are the gages to be made uſe of in turning the braſs tools exactly to the ſphere required.

But if the radius of the ſphere be very great, Mr. Huygens directs the gages to be made as follows. Imagine the line AE, (plate CXVIII. fig. 4. n° 1.) drawn upon the braſs plate to be the tangent of the required arch AFB, whoſe radius, for example, is 36 feet, and diameter 72. From A ſet off the parts AE, EE, *&c.* ſeverally equal to an inch, and let them be continued a little beyond half the breadth of the tool required: then as 72 feet, or 864 inches is to 1 inch, ſo let 1 inch be to a fourth number: this will be the number of decimal parts of an inch in the firſt line EF, reckoning from A. Multiply this fourth number ſucceſſively by 4, 9, 16, 25, *&c.* the ſquares of 2, 3, 4, 5, *&c.* and the ſeveral products will be the number of parts contained in the 2d, 3d, 4th, 5th, EF reſpectively. But becauſe theſe numbers of parts are too ſmall to be taken from a ſcale by a pair of compaſſes, ſubſtract them ſeverally from one inch, repreſented by the lines EG, and the remainders being taken from a ſcale of an inch divided into decimal parts, and transferred by the compaſſes from G to F, will determine the points F, F, *&c.* of the arch required. And the ſame being done on the other ſide of the line AD, the braſs plates muſt be filed away exactly to the points of this arch, aud poliſhed as before.

Mr. Huygens would have his plates or tools firſt formed in a turning lathe, and then ground together with emery; that is to ſay, the concave and convex tool of the ſame ſphere together: but the tools of very large ſpheres, he would have ground at firſt quite plane, by a ſtone-cutter; and then ground hollow with a round flat ſtone and emery, to the deſired gage.

The tools thus ground muſt be poliſhed by an incruſtation of pitch and emery, and perfected with blue hones. See the article POLISHING.

The glaſs being planed to an equal thickneſs, and poliſhed a little by a glaſs grinder, and rounded by a grind-ſtone, take away the plate with ſeveral ſteel cavities, and with ſome ſifted emery, made into a cement, fix on a ſmaller round piece of braſs, or rather ſteel, truly flat, and turned, about the bigneſs of a farthing, but thicker, having firſt made in the center thereof, with a triangular ſteel punch, a hole about the bigneſs of a gooſe-quill, and about the depth of $\frac{1}{12}$ of an inch; and at the very bottom of this triangular hole, a little round hole muſt be punched ſomewhat deeper, with a very ſmall ſteel punch. A ſmall ſteel point, of about an inch long, muſt be truly ſhaped and fitted to this triangular hole, and at the very apex to the ſmall round deep impreſſion. Nevertheleſs it muſt not be fitted ſo exactly, but that it may have the liberty to move a little to and fro; the apex always continuing to preſs upon the ſurface of the round hole below. This ſteel triangular point muſt be fixed to the end of a pole; to the other end of which another round iron point muſt be fixed, of about five or ſix inches long, to play freely up and down in a round hole in a piece of braſs let into a board fixed againſt the ceiling for that purpoſe, perpendicularly over the bench and over the center of the tool, which muſt be ſtrongly and truly fixed horizontally thereon, as repreſented in plate CXVIII. fig. 4. n° 2.

Having theſe things prepared, with ſome pots of emery of various fineneſſes, take of your roughheſt ſort a ſmall half pugil, wetting the ſame, and daubing it pretty equably on the tool; then lay on your glaſs, and fix up your pole, and continue to grind for a quarter of an hour; not preſſing upon the pole, but barely carrying the glaſs round thereby: then take a little quantity of ſome finer emery, and work another quarter of an hour therewith: then take the like quantity of emery ſtill finer, and work for the ſame time: laſt of all take a leſs quantity of ſome of the very fineſt you have, which will be ſufficient for a glaſs of five inches diameter, and work therewith for an hour and a half; taking away by little and little ſome of the emery with a wet ſponge,

ſponge. Do not keep it too wet nor too dry, but about the conſiſtence of pap: for much depends on this. If it be too dry, your emery will ſtick, clog, and incorporate, and cut little or none at all, beſides it will ſcratch and cut your glaſs irregularly; and if it is too wet, and too much diluted, it will, from the irregular ſeparation of its parts, cut in ſome places more than others, as in the other caſe.

But Mr. Huygens tells us, that this method of uſing various ſorts of freſh emery is not good; finding by experience, that the ſurfaces of large glaſſes are often ſcratched. And therefore he ſays, that it is beſt to take a large quantity of the firſt and ſecond emery, and ſo work with the ſame from the firſt to the laſt, taking away, by little and little, every half hour, or quarter of an hour, more and more of the emery with a wet ſponge, by which means he could bring the glaſs extremely ſmooth and fine, ſo as to ſee pretty diſtinctly a candle or the ſaſh-windows well defined through it, which is a mark when it is ground enough to receive a poliſh.

When you firſt begin to grind, and the emery begins to be ſmooth, the glaſs will ſtick a little to the tool, and run ſtiff; then freſh emery is to be added. The method hitherto deſcribed of grinding with emery, is what is recommended by Mr. Huygens. Le Pere Cherubin preſcribes another material, which is the grit of a hard grind-ſtone, well beaten into a fine powder, and ſifted pretty fine: and here in England the ſame thing was uſed to be performed by Mr. Cox with common clean white ſand, taking away by little and little the ſaid grit and ſand, as it is ground finer and finer; but it ſeems this method is now quite diſuſed.

The method of GRINDING *plate glaſs.* See the article GLASS.

GRINDSTEAD, or *Eaſt* GRINSTEAD, a borough-town of Suſſex, twenty-four miles directly ſouth of London, which ſends two members to parliament.

GRIPE, or GRIPES, in medicine, a ſort of colic, or painful diſorder of the belly. See the article COLIC.

GRIPE, or GRIP, in huſbandry, a ſmall ditch cut acroſs a meadow, or plowed land, in order to drain it.

GRIPE, in the ſea-language, is a piece of timber fayed againſt the lower piece of the ſtern, from the fore-maſt end of the keel, joining with the knee of the head: its uſe is to defend the lower part of the ſtern from any injury; but it is often made the larger, to make the ſhip keep a good wind.

Gripe of a ſhip, is alſo the compaſs or ſharpneſs of the ſtern under water, chiefly towards the bottom of it.

Gripe is alſo a ſea-term, for a ſhip's turning her head more to the wind than ſhe ſhould; this is cauſed either by overloading her a-head, the weight of which preſſes her down, ſo that ſhe will not readily fall off from the wind; or by ſtaying or ſetting her maſts too much aft: which is always a fault in ſhort ſhips that draw much water, ſince it cauſes them to be continually running into the wind: though in floating ſhips, if the maſts be not ſtayed very far aft, they will never keep a good wind.

GRIPSWALD, a town of Germany, in the circle of Upper Saxony, and province of ſwediſh Pomerania, ſituated on a bay of the Baltic ſea: eaſt long. 13° 40′, north lat. 54° 15′.

GRISLAGINE, in ichthyology, a ſpecies of cyprinus, with whitiſh fins, and eleven rays in that beſide the anus.

GRISLEA, in botany, a genus of the octandria-monogynia claſs of plants, the flower of which conſiſts of four extremely minute petals, of an oval figure, ariſing from the denticulations of the cup, and ſcarce larger than they. It is an american tree, ſufficiently diſtinguiſhed by its flower alone.

GRISONS, allies of Switzerland; their country is almoſt of a circular form, about ſixty miles over every way, and is bounded on the north by Tyrol and part of Switzerland; on the eaſt, by Tyrol and Trent; on the ſouth, by Italy; and by the Swiſs cantons on the weſt.

GRIST, in country-affairs, denotes corn ground, or ready for grinding. See the articles CORN and MILL.

GRITH, a ſaxon word ſignifying peace: from whence grithbreche is uſed in law-books for the breach of the peace.

GRITS, *ſaburræ.* See the article SABURRÆ.

GROANING, or HOOTING, among ſportſmen, the cry or noiſe of a buck in rutting time.

GROAT, an engliſh money of account, equal to four-pence.

GROATS, in country-affairs, oats after the hulls are off, or great oat-meal.

GROCERS, antiently were ſuch perſons as engroſſed all merchandize that was vendible; but now they are incorporated,

rated, and make one of the companies of the city of London, which deals in ſugar, foreign fruits, ſpices, &c.

GRODNO, a great city of Poland, in the province of Lithuania: eaſt long. 24°, north lat. 53° 40′.

GROENDALE, a town of Brabant, ſix miles ſouth eaſt of Bruſſels.

GROENLAND, or Spitzbergen, a cold miſerable country without inhabitants, and with very few animals or vegetables, ſituated between 10° and 30° eaſt long. and between 77° and 82° north lat.

GROGRAM, a kind of ſtuff, made of ſilk and mohair. Turky grograms pay on importation $8\frac{66\frac{1}{4}}{100}$d. the yard; and draw back, on being exported, $7\frac{50\frac{3}{8}}{100}$d. Liſle grograms, if narrow, pay 11 s. $6\frac{60}{100}$d. each piece, not exceeding 15 yards, and draw back 10s. $1\frac{1}{2}$d. but if broad they pay 17s. $3\frac{90}{100}$d. and draw back 15s. $2\frac{25}{100}$d. each piece, not exceeding 15 yards.

GROIN, *pubes*, in anatomy. See the article Pubes.

GROLL, a town of Guilderland, twenty-one miles eaſt of Zutphen.

GROMETS, in the ſea-language, ſmall rings formerly faſtened with ſtaples to the yards, to make faſt the gaſkets, but now never uſed.

GRONINGEN, the capital of a province of the ſame name, which makes one of the ſeven united provinces: eaſt long. 6° 40′, north lat. 53° 20′.

GRONOVIA, in botany, a genus of the pentandria-monogynia claſs of plants, the flower of which conſiſts of five extremely ſmall petals, of a roundiſh figure: the fruit is a roundiſh, coloured capſule, with only one cell, in which is contained a ſingle, large, and roundiſh ſeed.

GROOM, a name particularly applied to ſeveral ſuperior officers belonging to the king's houſhold, as groom of the chamber, groom of the ſtole. See the article Stole.

Groom-porter, an officer of the king's houſhold, who provides chairs, ſtools, and firing for the king's lodging, and alſo furniſhes cards, dice, &c. and decides the diſputes which ariſe at play.

Groom is more particularly uſed for a ſervant appointed to attend on horſes in the ſtable. It is his buſineſs to feed and water them, to curry and rub them down, and to keep a watchful eye over them, that they may have no inward or outward diſorder, without his diſcovering it, and uſing his endeavours to remove it.

GROOVE, among miners, is the ſhaft or pit ſunk into the earth, ſometimes in the vein, and ſometimes not.

Groove, among joiners, the channel made by their plough in the edge of a moulding, ſtyle, or rail, to put their pannels in, in wainſcotting.

Groove alſo denotes a gardener's tool for tranſplanting plants.

GROSS, in law-books, ſignifies abſolute or independent on another: thus, an advowſon in groſs, is one diſtinct and ſeparate from the manor.

Gross alſo denotes the quantity of twelve dozen, of things ſold by tale.

Gross-beak, in ornithology, the engliſh name of a bird called by authors loxia. See the article Loxia.

Gross weight, the whole weight of merchandizes, with their duſt and droſs: as alſo the bag or cheſt wherein they are contained. An allowance is uſually made out of the groſs-weight for tare and tret. See the article Tare.

GROSS-bois, in our old law-books, ſignifies wood of ſuch a growth as to be accounted timber. See Timber.

GROSSETTA, a city of Tuſcany, in Italy, fifty-five miles ſouth of Florence: eaſt long. 12°, north lat. 42° 40′.

GROSSULARIA, the gooseberry and currant-bushes, the ſame with the ribes of Linnæus. See the articles Ribes, Gooseberry, &c.

GROTESQUE, or Grotesk, in ſculpture and painting, ſomething whimſical, extravagant and monſtrous; conſiſting either of things that are merely imaginary, and have no exiſtence in nature; or of things ſo diſtorted, as to raiſe ſurprize and ridicule.

Groteſque work is the ſame with what is ſometimes called antique. The name is ſaid to have taken its riſe from the figures of this kind much uſed in adorning the grottos which in antient times were the tombs of eminent perſons or families; ſuch as that of Ovid, whoſe grotto was diſcovered near Rome about eighty years ago.

GROTESQUES, or Grotesks, are particularly uſed to ſignify thoſe fanciful ornaments of animals interſperſed among foliages, fruit, &c. as thoſe painted by Raphael Urbine in the Vatican, and thoſe carved by Michael Angelo, in the cieling of the portico of the capitol. Theſe kind of compartments are called by Vitruvius, harpagenituli.

GROTSKA, a city of Sileſia, and capital of a dutchy of the ſame name, thirty miles ſouth of Breſlaw: eaſt long. 17°, north lat. 50° 40′.

GROTSKA is alſo a town of Servia, in european Turky, twenty miles ſouth-eaſt of Belgrade: eaſt long. 21°, north lat. 45°.

GROTTO, in the natural hiſtory of the earth, a large deep cavern or den in a mountain or rock.

Of theſe we find ſeveral remarkable ones in different parts of the world. The moſt celebrated one of our own country, is that called Ookley-hole, on the ſouth ſide of Mendip-hills. Its length is about two hundred yards, and its height various; being in ſome places very low, and in others eight fathoms. There is another at Puzzoli, about four leagues from Naples, called the dog's grotto; becauſe a dog thrown into it is immediately killed, by a deſtructive vapour equally fatal to all animals within its reach. The milky grotto, *crypta lactea*, about a mile from the antient village of Bethlehem, is ſaid to have been thus called from the holy virgin's letting fall ſome drops of her milk in it; on which account the earth of this cavern has been ſuppoſed to poſſeſs the virtue of reſtoring womens milk.

GROTTO is alſo uſed for a ſmall artificial edifice made in a garden, in imitation of a natural grotto.

The outſides of theſe grottos are uſually adorned with ruſtic architecture, and their inſide with ſhell-work, coral, *&c.* and alſo furniſhed with various fountains, and other ornaments.

The following is recommended as a good cement for grotto-work. Take two parts of white roſin, melt it clear, add to it four parts of bees-wax; when melted together, add ſome flower of the ſtone you deſign to cement, two or three parts, or ſo much as will give the cement the colour of the ſtone; to this add one part of the flower of ſulphur: firſt incorporate all together over a gentle fire, and afterwards knead it with your hands in warm water. With this faſten the ſtones, ſhells, *&c.* after they are well dried, and warmed before the fire.

GROVE, in gardening, a ſmall wood impervious to the rays of the ſun.

Groves are not only great ornaments to gardens, but are alſo the greateſt relief againſt the violent heats of the ſun, affording ſhade to walk under in the hotteſt parts of the day, when the other parts of the garden are uſeleſs; ſo that every garden is defective which has not ſhade. See the article GARDEN.

Groves are of two ſorts, *viz.* either open or cloſe. Open groves are ſuch as have large ſhady trees which ſtand at ſuch diſtances, as that their branches approach ſo near to each other, as to prevent the rays of the ſun from penetrating through them.

Moſt of the groves that have been planted either in England or in the celebrated gardens of France, are only a few regular lines of trees; many of which are avenues to the habitation, or lead to ſome building or other object: but theſe do not appear ſo grand, as thoſe that have been made in woods, where the trees have grown at irregular diſtances: where they have large ſpreading heads, and are left ſo far aſunder, as to permit the graſs to grow under them, they then afford the greateſt pleaſure; for nothing is more noble than fine ſpreading trees, with large ſtems, growing through graſs, eſpecially if the graſs is well kept, and has a good verdure; beſides, moſt of thoſe planted groves have a gravel walk, made in a ſtraight line between them, which greatly offends the ſight of perſons who have a true taſte: therefore whenever a gravel-walk is abſolutely neceſſary to be carried through theſe groves, it will be much better to twiſt it about, according as the trees naturally ſtand, than to attempt regularity: but dry walks under large trees, are not ſo uſeful as in open places; becauſe after rain, the dropping of the trees will, for a conſiderable time, render the walks uſeleſs.

In planting groves, it is much the beſt way to diſpoſe the trees irregularly, which will give them a more magnificent and noble appearance, and alſo form a ſhade ſooner than when the trees are planted in lines.

When, in planting a garden, full grown trees are found upon the ſpot, they ſhould, if poſſible, remain inviolate; for it will be better to put up with many inconveniencies, than to deſtroy what will require an age to retrieve; ſo that nothing but offending the habitation, by being ſo near as to occaſion great damps, ſhould tempt us to cut them down.

Cloſe groves have frequently large trees ſtanding in them; but the ground under theſe are filled with ſhrubs or underwood;

wood; ſo that the walks which are in them are private, and ſcreened from winds; by which means they are rendered agreeable for walking, at ſuch times when the air is either too hot or too cold for walking in the more expoſed parts of the garden. Theſe are often contrived ſo as to bound the open groves, and frequently to hide the walls or other incloſures of the garden; and when they are properly laid out, with dry walks winding through them, and on the ſides of theſe ſweet-ſmelling ſhrubs and flowers irregularly planted, they have a charming effect: for here a perſon may walk in private, ſheltered from the inclemency of cold or violent winds, and enjoy the ſweets of the vegetable kingdom: therefore, when it can be admitted, if they are continued round the whole incloſure of the garden, there will be a much greater extent of walk; and theſe ſhrubs will appear the beſt boundary, where there are not fine proſpects to be gained.

GROUND, in agriculture, is much the ſame with earth or ſoil.

Ground, in painting, the ſurface upon which the figures and other objects are repreſented.

The ground is properly underſtood of ſuch parts of the piece, as have nothing painted on them, but retain the original colours upon which the other colours are applied to make the repreſentations.

A building is ſaid to ſerve as a ground to a figure, when the figure is painted on the building.

The ground behind a picture in miniature, is commonly blue or crimſon, imitating a curtain of ſattin or velvet; if it be to be blue, it ſhould be laid on as follows: waſh bice till it is very pure and clear, and temper a quantity in a ſhell ſufficient for your ground, letting it be thoroughly moiſt and well bound with gum. Then with a ſmall pencil lay on the ſame colour about the pourfile, that is, the ambient ſuperficies of the picture; having done this, take a large pencil, and waſh over the whole ground you deſign to cover with a blue, ſomewhat thin and wateriſh, and then with a pretty large pencil, full of colour and flowing, lay over with a thick and ſubſtantial colour what you had before only waſhed over; in the doing of this you muſt be very quick, keeping the colour you have laid on moiſt, and not ſuffering any part to dry till you have covered the whole.

If you would have your ground a crimſon like ſattin, then trace out where and in what places you will have thoſe ſtrong and hard lights and reflections to fall, which are ſeen in ſattin or velvet, with indian lake; there lay your lights with a lake that is thin and wateriſh, and while it is yet wet, lay the deepening and hard ſtrong ſhadows with a ſtronger and darker colour of lake thick ground, cloſe by the other lights. The beſt way for imitation, is to have a piece of ſattin before you to imitate.

Ground, in etching, denotes a gumous compoſition ſmeared over the ſurface of the metal to be etched, to prevent the aquafortis from eating, except in ſuch places where this ground is cut through with the point of a needle. See the article Etching.

Ground *of a ſhield*, the ſame with field. See the article Field.

Faſt **Ground**, or **Shelf**. See Shelf.

Ground-angling, fiſhing under water without a float, only with a plumb of lead or a bullet, which is better, becauſe it will roll on the ground; this method of fiſhing is moſt proper in cold weather, when the fiſh ſwim very low.

The bullet is to be placed about nine inches from the baited hook. A perſon in fiſhing in this manner, ought not to ſtrike as ſoon as he feels the fiſh bite, but ſlack his line, that the fiſh may the better ſwallow the bait and hook. As for the tackle, it ſhould be fine and ſlender; for ſtrong and thick lines only ſerve to fright the fiſh.

The morning and evening are the chief ſeaſons for the ground-line in fiſhing for trout; but if the day prove cloudy, or the water muddy, you may fiſh at ground all day.

Ground-pluming, is to find out the depth of the water in fiſhing; which is done by a muſket-bullet with an hole through it, tied to a ſtrong twiſt and hung on the hook.

Ground-ivy, *hedera terreſtris*, in botany. See the article Glechoma.

Ground-ivy is attenuant and diſſolvent, and famous both internally and externally as a vulnerary. It is much uſed with us in an infuſion in form of tea, for diſorders of the breaſt and lungs, and is ſometimes an ingredient in pectoral decoctions. A conſerve made of the plant when in flower, retains its virtues in an agreeable form, but is ſeldom kept in the ſhops. It is eſteemed a ſpecific in eroſions and exulcerations of the viſcera, and particularly of the kidneys and lungs. It is alſo recommended in conſumptions, bruiſes from falls, head-achs, and other the like diſorders.

Ground pine, in botany, a plant called by authors chamæpitys, or teucrium. See the article Teucrium.

Stinking **Ground-pine**, in botany. See the article Polycnemum.

Ground-tackle, is a ſhip's anchors, cables, *&c.* and, in general, whatever is neceſſary to make her ride ſafe at anchor.

Ground-timbers, are thoſe timbers in the ſhip which lie on her keel, and are faſtened to it with bolts thro' the keelſon. They are ſo called from the ſhip's reſting upon them when ſhe is aground.

Ground-tows, are what comes from the hemp when dreſſed at the hatchel for the ſpinners, and out of which hamburgh or cabbin-lines, marlin, and white ocham are made.

Ground-work, in a building, the ſame with foundation. See Foundation.

GROUNDAGE, a cuſtom or tribute paid for the ground on which a ſhip ſtands in port.

GROUNDING, is bringing a ſhip on ground to be cleaned, trimmed, or to have a leak ſtopped.

GROUNDLING, in ichthyology, the ſmooth, ſpotted cobitis, with the body of a cylindrical figure, and otherwiſe called the loach. See Cobitis.

GROUNDSEL, *ſenecio*, in botany, *&c.* See the article Senecio.

GROUP, in painting and ſculpture, is an aſſemblage of two or more figures of men, beaſts, fruits, or the like, which have ſome apparent relation to each other.

It is neceſſary in a good piece of painting, that all the figures be divided into groups: this has ſomewhat in it of the nature of ſymphony or concert of voices; for as in the one the voices muſt ſuſtain each other, in order to fill the ear with an agreeable harmony from the whole; ſo in groups, if the parts or figures be not well diſpoſed, ſomething will be found diſagreeable.

There are two kinds of groups, or two manners of conſidering them, with reſpect to the deſign, and to the clair-obſcure. The firſt of theſe is common both to works of painting and ſculpture; but the latter is peculiar to painting.

Groups, with reſpect to the deſign, are combinations of ſeveral figures, which bear a relation to each other, either upon account of the action, or of their proximity, or of the effect they produce. Theſe we conceive as repreſenting ſo many different ſubjects, or at leaſt ſo many diſtinct parts or members of one great ſubject. Thus, in architecture, we ſay a group of columns, when we ſpeak of three or four columns ſtanding together on the ſame pedeſtal.

Groups, with reſpect to the clair-obſcure, are aſſemblages of figures, where the lights and ſhadows are diffuſed in ſuch a manner, that they ſtrike the eye together, and naturally lead it to conſider them in one view.

Group, in muſic, one of the kinds of diminutions of long notes, which, in working, form a ſort of group, knot, or buſh. It uſually conſiſts of four or more crotchets, quavers, *&c.* tied together at the diſcretion of the compoſer.

GROUPADE, or Croupade, in the manege. See the article Croupade.

GROUPED column. See Column.

GROUSE, or Growse, a ſpecies of the tetrao, is a valuable bird of the ſize of a well-grown fowl; the head is large; the eyes bright and piercing; the ears are patulous, the beak is three quarters of an inch long, and of a pale colour, ſomewhat hooked, and pointed at the extremity: it has a ſcarlet protuberance over the eyes, which is very bright and beautiful; its wings are variegated, and its tail forked. The male, excepting the little variegations of white in his wings, is totally black, and there is a fine changeable tinge of a deep blue on his neck; but the female is brown and mottled, and in colour reſembles the woodcock.

This is a native of England, but is not very frequent; it lives on large mountainous heaths.

GROWAN, among the miners of Cornwal, a coarſe gritty ſtone, of a greyiſh colour, which they are often obliged to dig through, before they can reach the ore.

GROYNE, or Corunna, a port of Spain. See the article Corunna.

GRUB, in zoology, the engliſh name of the hexapode worms, produced from the eggs of beetles, and which at length are transformed into winged inſects of the ſame ſpecies with their parents. See the article Scarabæus.

GRUBS, in medicine, certain unctuous pimples riſing in different parts of the face, but chiefly in the alæ of the noſe. The cure of theſe ought only to be attempted by evacuations and cleanſers of the blood.

GRUBBING, in agriculture, the digging or pulling up the ſtubs and roots of trees.

When the roots are large, this is a very troubleſome and laborious taſk; but Mr. Mortimer has ſhewn how it may be accompliſhed ſo as to ſave great expence by a very ſimple and eaſy method. He propoſes a ſtrong iron-hook to be made, about two feet four inches long, with a large iron-ring faſtened to the upper part of it. See plate CXXI. fig. 2. This hook muſt be put into a hole on the ſide of the root, to which it muſt be faſtened, and a lever being put into the ring, two or three men, by means of this lever, may wring out the root, and twiſt the ſap-roots aſunder. Stubs of trees may alſo be taken up with the ſame hook, in which work it will ſave a great deal of labour, though not ſo much as in the other, becauſe the ſtubs muſt be firſt cleft with wedges before the hook can enter the ſides of them, to wrench them out by pieces.

Grubbing *a cock*, with cock-fighters, a term uſed for cutting off the feathers under his wings.

This is a thing not allowed by cockpit-law, nor is any one permitted to cut off the feathers in any handling place.

GRUBENHAGEN, a town and caſtle of lower Saxony and dutchy of Brunſwic, remarkable for its mines of ſilver, copper, iron, and lead: eaſt long. 9° 36′, and north lat. 51° 45′.

GRUME, *grumus*, in medicine, denotes a concreted clot of blood, milk, or other ſubſtance. Hence grumous blood is that which approaches to the nature of grume, and by its viſcidity, and ſtagnating in the capillary veſſels, produces ſeveral diſorders.

GRUMOSE ROOTS, among herbaliſts, ſuch as are knotty, and faſtened to one head, like thoſe of celandine and anemonies. See the article Root.

GRUS, the CRANE, in ornithology, a bird of the ardea or heron-kind. See the article Ardea.

The common crane, or ardea with the top of the head papilloſe, is a large, ſtately, and beautiful bird, with a very long neck. The indian crane, with the whole upper part of the head papilloſe, is ſmaller than the european or common kind, but otherwiſe very like it. See the article Crane.

Grus, in antiquity, a kind of dance which the young Athenians performed every year at Delphos, about the altar of Apollo, on the day of Delia.

The ſteps and figures of this dance, which were intricate and running one into another, were deſigned to expreſs the turnings and windings of the labyrinth in which Theſeus killed the minotaur.

GRY, a meaſure containing one tenth of a line. See the article Line.

GRYGALLUS, in ornithology, a name given to the urogallus, or tetrao. See the article Tetrao.

GRYLLO-TALPA, the MOLE-CRICKET, a ſpecies of gryllus, with the anterior feet palmated. See the next article.

This is the largeſt of all the european winged inſects, being two inches and an half in length, and three quarters of an inch in diameter. Its colour is a duſky-brown, and there grow from the extremity of the tail, on each ſide, two hairy bodies reſembling in ſome degree the tail of a mouſe. See plate CXXI. fig. 4.

GRYLLUS, in zoology, the name of the cricket and locuſt-kind, which, together with the graſshoppers, make only one genus of inſects, the characters of which are theſe: the antennæ are ſetaceous; the exterior wings are membranaceous, narrow, and have much of the appearance of the wings of ſome of the fly-kind; the thorax is compreſſed and angulated; and the legs are formed for leaping. See the articles Locust and Gryllo-talpa.

Gryllus, in ichthyology, a name given to two diſtinct fiſhes, the conger-eel and ophidion. See the articles Conger and Ophidion.

GRYPHITES, in natural hiſtory, in engliſh CROW'S STONE, an oblong foſſile ſhell, very narrow at the head, and becoming gradually wider to the extremity, where it ends in a circular limb; the head or beak of this is very hooked or bent inward.

They are frequently found in our gravel or clay-pits, in many counties. There are three or four diſtinct ſpecies of them; ſome are extremely rounded and convex on the back, others leſs ſo; and the plates of which they are compoſed, are in ſome ſmaller and thinner, in others thicker and larger, in ſpecimens of the ſame bigneſs. See plate CXXIV. fig. 2.

GRYPHUS, a kind of ænigma. See the article ÆNIGMA.

GUADALAJARA, a city of Mexico, in north America, and the capital of Guadalajara, or New Galicia: weſt long. 108°, and north lat. 20° 45′.

GUADALAVIAR, a river of Spain, which riſes in the province of Arragon, and runs ſouth-eaſt through the province of Valencia, falling into the Mediterranean a little below the city of Valencia.

GUADALAXARA, a city of Spain, in the province of New Caſtile, twenty-eight miles north-weſt of Madrid: weſt long. 3° 50′, and north lat. 40° 40′.

GUADALUPE, one of the largeſt of the Caribbee-iſlands, eighty miles north of Martinico, ſubject to France: weſt long. 61°, and north lat. 16° 30′.

GUADARAMA, a town of New Caſtile, in Spain, twenty-three miles north-weſt of Madrid: weſt long. 4° 45′, and north lat. 40° 45′.

GUADIANA, a river of Spain, which riſes in the middle of New Caſtile, and running through Eſtremadura, enters Portugal; where paſſing through the provinces of Alentejo and Algarva, it diſcharges itſelf into the Atlantic ocean.

GUADILBARBAR, a river of Africa, which riſes in the mountains of Atlas, runs through the kingdom of Tunis, and falls into the Mediterranean ſea near Bona.

GUADILQUIVIR, a river of Spain, which riſes in the mountains of Segura, in New Caſtile, runs the whole length of Andaluſia, and paſſing by Cordova and Seville, falls into the Atlantic ocean at St. Lucar.

GUADIX, a city of Spain, in the province of Granada: weſt long. 3°, and north lat. 37° 15′.

GUAJACUM, or GUAIACUM, in botany, a genus of the decandria-monogynia claſs of plants, the flower of which conſiſts of five ovato-oblong patent petals, whereof the ſuperior ones are leaſt; the fruit is a roundiſh obliquely acuminated drupe, furrowed on one ſide; and the ſeeds are oval nuts, covered with pulp.

The wood of guaiacum is extremely hard and ſolid, of a denſe, compact texture, and remarkably heavy; it conſiſts of two parts, a central matter, or heart, and an exterior one, or blea: the central part is extremely hard and ponderous, and is of a greeniſh colour, or elſe it is variegated with a pale or whitiſh colour, a duſky green, and a browniſh with the black: the external part is of the colour of box-wood; but when we ſee the fragments of the branches of the tree entire, it is covered with a thin ſtrong bark. The wood is of a fragrant ſmell, and of an aromatic and pungent, but ſomewhat bitteriſh taſte.

Guaiacum is attenuant and apperient: it promotes the diſcharges by ſweat and urine, and ſtrengthens the ſtomach and the other viſcera. It is an excellent medicine in obſtructions of the liver and ſpleen, in the jaundice, dropſy, and many other chronic caſes, and gives relief in the rheumatiſm, and even in the gout.

The bark is a more powerful attenuant than the wood, but it is leſs proper for people of a feveriſh diſpoſition. Neither of them are given much in ſubſtance, the uſual way being in decoction with ſaſſafras, and other medicines of the ſame intention.

Beſides the wood and the bark, we have a reſin of it, under the improper name of gum-guaiacum. This is a ſolid but very friable ſubſtance, much reſembling common reſin, except in colour, it being of a duſky greeniſh hue, and ſometimes, though leſs frequently of a reddiſh colour. It is very acrid and pungent to the taſte, and when burnt, ſmells like guaiacum wood. It is given in the ſame caſes with the wood, and the famous balſamum polycreſtum is made of it.

GUALEOR, a city of the hither India, and the capital of the province of Gualeor, ſituated forty miles ſouth of Agra: eaſt long. 79°, and north lat. 26°.

GUAM, the chief of the Ladrone-iſlands, in the Pacific ocean: eaſt long. 140°, and north lat. 14°.

GUAN, or QUAN, an american bird, a little bigger than the common hen. In ſhape it ſomewhat reſembles a turkey, to which Mr. Edwards takes it to be near of kin. The top of the head is covered with black feathers, which it can erect into a creſt: the upper part of the body is of a dark colour, and the neck, breaſt, and belly are of the ſame colour, only ſpotted with white. See plate CX. fig. 3.

GUANIHANI, or ST. SALVADOR, now called Catt-iſland, one of the Bahama-iſlands in the Atlantic ocean, in north America: weſt longitude 76°, north latitude 24°.

GUANUCO, a town of Peru, in ſouth

America, one hundred and eighty miles north-eaſt of Lima: weſt long. 75° 15′, and ſouth lat. 10°.

GUARANTY, in matters of polity, the engagement of mediatorial or neutral ſtates, whereby they plight their faith, that certain treaties ſhall be inviolably obſerved, or that they will make war againſt the aggreſſor.

GUARANTY, or WARRANTY, in law. See the article WARRANTY.

GUARD, in a general ſenſe, ſignifies the defence or preſervation of any thing; the act of obſerving what paſſes, in order to prevent ſurprize; or the care, precaution, and attention we make uſe of, to prevent any thing happening contrary to our intention or inclinations.

GUARD, in the military art, is a duty performed by a body of men, to ſecure an army or place from being ſurprized by an enemy.

In a garriſon the guards are relieved every day, and it comes to every ſoldier's turn once in three days, ſo that they have two nights in bed, and one upon guard. To be upon guard, to mount the guard, to diſmount the guard, to relieve the guard, to change the guard, the officer of the guard, or the ſerjeant of the guard, are words often uſed, and well underſtood.

Advanced GUARD, is a party of either horſe or foot, that marches before a more conſiderable body, to give notice of any approaching danger.

When an army is upon the march, the grand-guards which ſhould mount that day, ſerve as an advanced-guard to the army: in ſmall parties, ſix or eight horſe are ſufficient, and theſe are not to go above four or five hundred yards before the party.

An advanced guard is alſo a ſmall body of twelve or ſixteen horſe, under a corporal, or quarter-maſter, poſted before the grand-guard of a camp.

Artillery-GUARD, is a detachment from the army, to ſecure the artillery: their corps de garde is in the front, and their centries round the park. This is a forty-eight hours guard: and upon a march, they go in the front and rear of the artillery, and muſt be ſure to leave nothing behind; if a gun or waggon break down, the captain is to leave a part of his guard to aſſiſt the gunners and matroſſes in getting it up again.

Corps de GARDE, are ſoldiers entruſted with the guard of a poſt, under the command of one or more officers.

Counter-GUARD, in fortification. See the article COUNTER-GUARD.

Forrage-GUARD, a detachment ſent out to ſecure the forragers, which are poſted at all places, where either the enemy's party may come to diſturb the forragers; or where they may be ſpread too near the enemy, ſo as to be in danger of being taken. They conſiſt both of horſe and foot, and muſt ſtay at their poſts till the forragers all come off the ground.

Grand-GUARD, three or four ſquadrons of horſe, commanded by a field officer, poſted at about a mile and a half from the camp, on the right and left wings, towards the enemy, for the ſecurity of the camp.

Main-GUARD, that from whence all the other guards are detached.

Thoſe who are to mount the guard, meet at their reſpective captain's quarters, and go from thence to the parade; where, after the whole guard is drawn up, the ſmall guards are detached for the poſts and magazines; and then the ſubaltern officers throw lots for their guards, and are commanded by the captain of the main-guard.

Piquet-GUARD, a good number of horſe and foot always in readineſs in caſe of an alarm: the horſe are all the time ſaddled, and the riders booted. The foot draw up at the head of the battalion, at the beating of the tattoo; but afterwards return to their tents, where they hold themſelves in readineſs to march, upon any ſudden alarm. This guard is to make reſiſtance, in caſe of an attack, till the army can get ready.

Quarter-GUARD, a ſmall guard, commanded by a ſubaltern officer, poſted by each battalion, about an hundred yards before the front of the regiment.

Rear-GUARD, that part of the army which brings up the rear, which is generally the old grand-guards of the camp. The rear-guard of a party is ſix or eight horſe, that march about four or five hundred paces behind the party. The advanced-guard of a party on its going out, make the rear-guard on its return.

Standard-GUARD, a ſmall guard, under a corporal, out of each regiment of horſe, and placed on foot, in the front of each regiment.

Van-GUARD, that part of the army which marches in the front.

GUARD is more particularly underſtood of a ſoldier a ſoldier detached from a company or corps, to protect, detain, or ſecure any perſon, *&c.*

GUARDS are alſo troops kept to guard the king's perſon, called alſo royal-guards, life-guards, gardes du corps, *&c.* Theſe are diſtinguiſhed into horſe, foot, grenadiers, and yeomen.

The engliſh horſe-guards are diſtinguiſhed by troops, and the foot-guards by regiments.

Yeomen of the GUARD. See the article YEOMEN.

The french GUARDS are divided into thoſe within, and thoſe without the palace; the firſt conſiſts of the gardes du corps, or body-guard, which conſiſts of four companies of horſe, the firſt of which companies was antiently Scotch, and ſtill retains the name, though it now conſiſts wholly of Frenchmen. The guards without, are the gens d' armes, light-horſe, muſqueteers, and two other regiments, the one of which is French and the other Swiſs. See GENDARMES.

GUARD, in fencing, is a poſture proper to defend the body from an enemy's ſword.

There are four general guards of the ſword; to form a perfect idea of which, we muſt ſuppoſe a circle drawn on a wall, and divided into four cardinal points, *viz.* top and bottom, right and left. When the point of the ſword is directed to the bottom of the circle, with the hilt oppoſite to its top, the body inclining very forward, this is called the prime or firſt guard. The ſecond guard, by many improperly called the tierce, is when the point is directed to the right or ſecond point of the ſame circle, with the hilt of the ſword turned to the left, and the body proportionably raiſed. The tierce, or third guard, is when the point of the ſword is raiſed to the uppermoſt part of the ſame circle; in which caſe the body, the arm, and the ſword, are in their natural poſition, and in the mean of the extremes of their motion. The quart, or fourth guard, is when the point of the ſword is directed to the fourth point of the circle, deſcending to the right as far as one fourth of the tierce, with the outward part of the arm and the flat of the ſword turned towards to the ground, and the body out of the line to the right, and the hilt of the ſword towards the line to the left. There is alſo a quint, or fifth guard, which is only the return of the point of the ſword to the right, after traverſing the circle to the point of the prime, from whence it had departed, with a different diſpoſition of the body, arm, and ſword. The common center of all thoſe motions ought to be in the ſhoulder.

In all theſe kinds of guards, there are the high-advanced, high-retired, and high-intermediate guard, when diſpoſed before the upper part of the body, either with the arm quite extended, quite withdrawn, or in a mean ſtate. The mean-advanced guard, or ſimply mean guard, is when the ſword is placed before the middle part of the body. The low-advanced, retired or intermediate guards, are thoſe where the arm and ſword are advanced, withdrawn, or between the two extremes, before the lower part of the body.

GUARDANT, or GARDANT, in heraldry. See the article GARDANT.

GUARDIAN, in law, a perſon who has the charge of any thing; but more commonly it ſignifies one who has the cuſtody and education of ſuch perſons as have not ſufficient diſcretion to take care of themſelves and their own affairs, as children and ideots.

There are ſeveral ſorts of theſe guardians at common law, *viz.* guardians by nature, who are the father and mother; guardians in ſocage, being the next of blood; and guardians by reaſon of nurture, which is when the father by will appoints a perſon to be the guardian of his child. The ſtatute ordains, that a father, by deed in his life-time, or by his will, may diſpoſe of the cuſtody of his child, under twenty-one years of age and not married, during the child's minority, to any perſons who are not popiſh recuſants, as he ſhall think fit; which guardians may bring actions of treſpaſs, *&c.* againſt any unlawful takers away of ſuch child or children, and take poſſeſſion of their lands, *&c.* If the father appoints no guardians to his child, the ordinary, or ſpiritual court have power to order one for the goods and perſonal eſtate only, until the infant is of the age of fourteen; but as to his lands, there ſhall be a guardian in ſocage, *&c.* This guardianſhip in ſocage continues till the minor is fourteen years of age, at which time he may chuſe his guardian before a judge, at his chambers, or in court, or chancery: likewiſe after the infant comes to that age, he may ſue his guardian in ſocage, to account as bailiff.

The buſineſs of guardians is to take the profits of the minor's lands to his uſe, and to account for the ſame: they ought to ſell all moveables within a reaſonable time, and to convert them into land or money, except the minor is near of age, and may want ſuch things himſelf; and they are to pay intereſt for the money in their hands, that might have been ſo placed out; in which caſe it will be preſumed that the guardians made uſe of it themſelves. They are to ſuſtain the land of the heir, without making deſtruction of any thing thereon, and to keep it ſafely for him: if they commit waſte on the lands, it is a forfeiture of the guardianſhip. 3 Edw. I. And where perſons as guardians, hold over any land, without the conſent of the perſon who is next intitled, they ſhall be adjudged treſpaſſers, and ſhall be accountable. 6 Annæ, cap. xviii.

Guardians d'eglise, are churchwardens or officers choſen in every pariſh, to have the care and cuſtody of the goods of the church.

Guardians *of the peace*, are thoſe who have the keeping of the peace.

Guardian, or Warden *of the cinque-ports*, is an officer who has the juriſdiction of the cinqueports, with all the power which the admiral of England has in other places.

Guardian *of the ſpiritualities*, the perſon to whom the ſpiritual juriſdiction of any dioceſe is committed, during the time the ſee is vacant.

A guardian of the ſpiritualities may likewiſe be either ſuch in law, as the archbiſhop is of any dioceſe within his province; or by delegation, as he whom the archbiſhop, or vicar-general of the time, appoints. Any ſuch guardian has power to hold courts, grant licences, diſpenſations, probates of wills, *&c.*

GUBEN, a town of Germany, in the circle of Upper Saxony: eaſt long. 15°, and north lat. 51° 50′.

GUDGEON, *gobius*, in ichthyology. See the article Gobius.

Gudgeons, in a ſhip, are the eyes drove into the ſtern-poſt, into which the pintles of the rudder go, to hang it. See plate CXXI. fig. 3.

The ſtems of the gudgeons are barbed, to prevent their being drawn out.

GUELPHS and Gibelins. See the article Gibelins.

GUENGA, a great river of the hither India, which riſing in the mountains of Balagate, runs north eaſt, and falls into the weſt branch of the river Ganges, in Bengal.

GUERET, a town of France, in the province of Lionois: eaſt long. 2°, and north lat. 46° 5′.

GUERITE, a ſmall tower of wood or ſtone, generally placed on the point of a baſtion, or on the angles of the ſhoulder, to hold a centinel, who is to take care of the foſs, and to watch, in order to prevent a ſurprize.

GUERNSEY, or Garnsey, an iſland in the engliſh channel, on the coaſt of Normandy, fifty-eight miles ſouth of Portland, in Dorſetſhire, and twenty-two weſt of cape la Hogue, in Normandy; about ten miles long and as many broad, containing ten pariſhes. The natives, who ſpeak French, are ſtill governed by the norman laws, but are ſubject to England.

GUETTARDA, in botany, a genus of the monoecia heptandria claſs of plants, the male and female flowers of which are monopetalous and funnel-ſhaped; the fruit is a dry, roundiſh, depreſſed drupe, containing a ſingle ſeed.

GUIAQUIL, a city and port-town of Peru, ſituated near the Pacific ocean: weſt long. 80°, and ſouth lat. 3°.

GUIARA, a port-town on the Caracoa-coaſt, in terra firma, in South America: weſt long. 66°, and north lat. 10° 35′.

GUIDON, a ſort of flag or ſtandard, borne by the king's life-guards; being broad at one extreme, and almoſt pointed at the other, and ſlit or divided into two.

Guidon alſo denotes the officer who bears the guidon. He is the ſame in the horſe-guards that the enſign is in the foot. The guidon of a troop of horſe takes place next below a cornet.

GUIENNE, a province of France, bounded by the Orleanois on the north, by Gaſcony, from which it is ſeparated by the river Garonne, on the ſouth, by Languedoc on the eaſt, and by the bay of Biſcay on the weſt.

GUILANDINA, bonduch, in botany, a genus of the decandria-monagynia claſs of plants, the flower of which conſiſts of five lanceolate and ſeſſile petals: the fruit is a rhomboidal pod, containing only one cell, in which are included numerous oſſeous ſeeds, of a globoſo-compreſſed figure. The ſeeds of this plant, which are called Molucca nuts, are ſaid to be good in hernioſe tumours, and in the cholic; and to create an appetite and to promote the menſes.

GUILD, or **GILD**, a fraternity or company. As to the original of theſe guilds or companies, it was a law among the Saxons that every freeman of fourteen years of age, ſhould find ſureties to keep the peace, or be committed; upon which the neighbours entered into an aſſociation, and became bound for each other, either to produce him who committed any offence, or to make ſatisfaction to the injured party; in order to which they raiſed a ſum among themſelves, which they put into a common ſtock; out of which they upon occaſion, made a pecuniary compenſation according to the quality of the offence committed. Theſe guilds are now companies, joined together with laws and orders made by themſelves, by the licence of the prince.

GUILD, **GILD**, or **GELD**, is alſo uſed among our antient writers for a compenſation, or mulct, for a fault committed.

GUILD-HALL, the chief hall of the city of London, for holding of courts, and for the meeting of the lord-mayor and commonalty, in order to make laws and ordinances for the welfare and regulation of the city.

GUILD-RENTS, are rents paid to the crown by any guild or fraternity: or thoſe that formerly belonged to religious houſes, and came to the crown at the general diſſolution of monaſteries.

GUILDFORD, or **GULDEFORD**, a borough-town of Surry, ſituated on the river Wye, thirty miles ſouth-weſt of London.

It ſends two members to parliament.

GUILLESTRE, a city of France, in the province of Dauphiny: eaſt long 6° 20′, and north lat. 44° 45′.

GUINEA, a large country of Africa, ſituated between 15° eaſt and 15° weſt longitude, and between 4° and 10° north latitude.

The Britiſh, Dutch, French; and other nations, have forts and factories on this coaſt.

GUINEA is alſo the name of a Britiſh gold-coin. See the article COIN.

GUINEA-PIG, in zoology, a quadruped of the mouſe or rat-kind, with a variegated body, reſembling, in ſome meaſure, a young pig, whence the name. It is conſiderably larger than the rat, but leſs than the rabbit. See plate CXXI. fig. 5.

GUINEA-WORM, *dracunculus*, in zoology and medicine. See the article DRACUNCULI.

GUIPUSCOA, the north-eaſt diviſion of the province of Biſcay, in Spain, ſituated on the confines of Navarre in France.

GUISE, a town of France, in the province of Picardy, ſituated on the river Oyſe: eaſt long. 3° 36′. and north lat. 49° 55′.

GUITAR, or **GUITARRA**, a muſical inſtrument of the ſtring-kind, with five double rows of ſtrings, of which thoſe that are baſs, are in the middle, unleſs it be for the burden, an octave lower than the fourth.

This inſtrument was firſt uſed in Spain, and by the Italians. It has the particular denomination of ſpagnuola given it; and is found in Italy and other countries, but more frequently in Spain.

GULA, in anatomy, the ſame with the œſophagus. See OESOPHAGUS.

GULA, or **GOLA**, in architecture, a wavy member the contour of which reſembles the letter S, which the Greeks call cymatium, and our architects an ogee. See the article CYMATIUM and OGEE.

This member is of two kinds, recta and inverſa. The firſt and principal has its cavities or hollows above, and convexities below. This always makes the top of the corona of the corniche, jetting over the drip of the corniche, like a wave ready to fall. It is ſometimes abſolutely the entablature, as being the firſt or uppermoſt member of it.

The ſecond, being alſo called gula inverſa, as the firſt is called gula recta, is exactly the reverſe of the former, the cavity or hollowneſs of it being at the bottom, ſo that with reſpect to the former it appears inverted. This is uſed in the architrave, and ſometimes in the corniche along with the former, only ſeparated by a reglet.

GULES, in heraldry, ſignifies the colour red, which is expreſſed in engraving by perpendicular lines falling from the top of the eſcutcheon to the bottom. See plate CXXI. fig. 6.

It is the firſt of all colours in armory, and was formerly prohibited to be worn by any perſon in his coat-armour, unleſs he were a prince, or had a permiſſion from him. This colour is a ſymbol of charity, valour, and generoſity, and repreſents blood-colour, and true ſcarlet.

The Romans, according to Spelman, painted the bodies of their gods, and generals that triumphed, with vermilion; and under the conſuls, their ſoldiers were clad in red, hence called ruſſati. And we are told that the Lacedemonians wore ſcarlet, to prevent ſeeing the blood iſſue from their wounds. Thoſe who bear this colour, are obliged to relieve ſuch as

are

Fig. 1.
GRAPNELS.

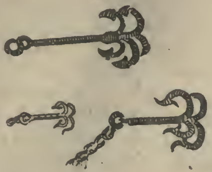


Fig. 2.
GRUBBING-HOOK.

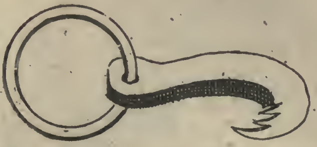


Fig. 3.
GUDGEON.

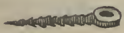


Fig. 4.
GRYLLOTALPA

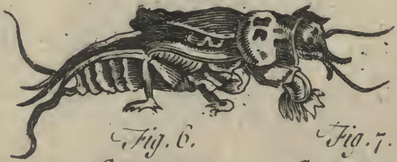


Fig. 5. GUINEA-PIG

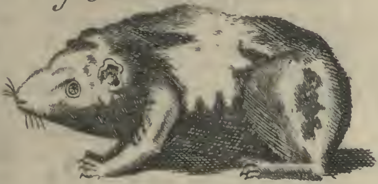


Fig. 6.
GULES.

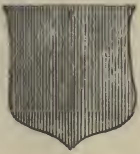


Fig. 7.
GUSSET.

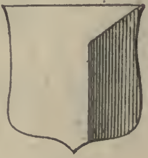
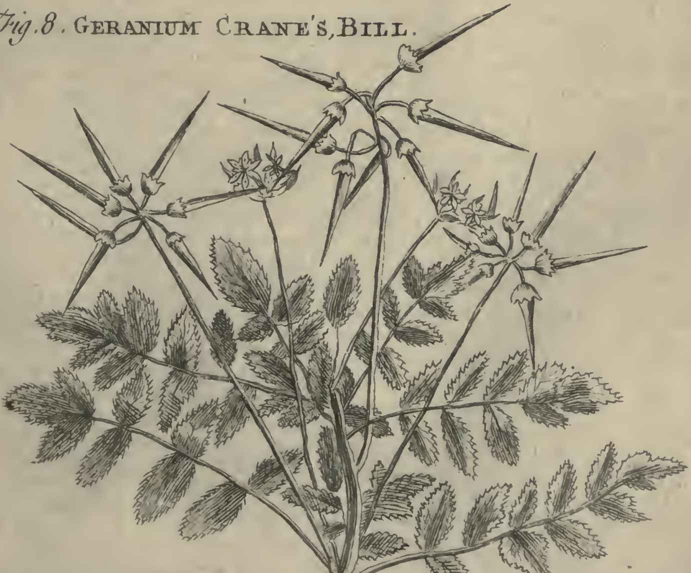


Fig. 8. GERANIUM CRANE'S, BILL.



T. Jefferys sculp

are in danger of being oppreſſed by injuſtice.

GULL, the engliſh name of a genus of birds, called by authors larus. See the article LARUS.

GULLET, in anatomy, the engliſh name of the œſophagus. See OESOPHAGUS.

GULO, in zoology, a ſpecies of muſtela, of a reddiſh brown colour, with the middle of the back black. See the article MUSTELLA.

This is of the ſize of our common cat; the head is ſmall, and of a kind of oval figure, ſlender at the ſnout, and rounded at the crown; the eyes are prominent, though not very large; the iris is of a deep hazel; the ears are ſhort and patulous; the noſtrils are large; the mouth is wide, and well furniſhed with teeth.

GULPH, or GULF, in geography, a part of the ſea, almoſt ſurrounded by land, as the gulph of Mexico, gulph of Venice, of Lyons, *&c.*

A gulph is ſtrictly diſtinguiſhed from a ſea, in that the latter is larger. See the article SEA.

It differs from a bay, in being greater than it. See the article BAY.

Some will have it eſſential to a gulph, to run into the land through a ſtreight or narrow paſſage. It is obſerved that the ſea is always moſt dangerous near gulphs, by reaſon of the currents being penned up by the ſhores.

GUM, in pharmacy, a concreted vegetable juice, which tranſudes through the bark of certain trees, and hardens upon the ſurface.

The chemiſts allow only thoſe to be properly gums, which are diſſolvable in water; thoſe which are only diſſolvable in ſpirits, they call reſins; and thoſe of a middle nature, gum reſins. Geoffroy ſays, that gums are ſomething between acid and oil; being an acid ſalt ſo fixed in earth, as that the greateſt part of it is changed to an alkali, the other into oil; ſo that the mixture ariſing from thence is an oily ſalt reſembling the ſaponaceous concretes of the chemiſts, made of oil of olives, and a lixivium of tartar; or the mucilaginous bodies formed of ſpirit of wine, and the volatile ſpirit of urine.

The bodies of this claſs, Dr. Hill obſerves, if we were to allow all to be ſo which are generally received as ſuch, and called by the name gum, would appear very numerous: but, on a ſtrict enquiry, the far greater part of them appear to be properly either of the gum-reſin, or of the abſolute reſin-claſs, when all that are thus improperly called gums are ſeparated and placed in their proper claſſes. See the article RESIN.

The bodies truly belonging to this, are, by that author, reduced to ſo ſmall a number as four; theſe are, 1. Gum arabic. 2. Gum ſeneca. 3. Gum tragacanth. 4. Manna.

GUM ARABIC. See *Gum* ARABIC.

GUM SENECA, or SENEGA, as it is commonly written, is a gum extremely reſembling gum arabic. It is brought to us from the country through which the river Senega runs, in looſe or ſingle drops, but theſe are much larger than thoſe of the gum arabic uſually are; ſometimes it is of the bigneſs of an egg, and ſometimes much larger: the ſurface is very rough, or wrinkled, and appears much leſs bright than the inner ſubſtance, where the maſſes are broken. It has no ſmell, and ſcarce any taſte. We are not acquainted with the tree which produces it. The virtues of it are the ſame with the gum arabic; but is rarely uſed in medicine, unleſs as mixed with the gum arabic: the dyers and other artificers conſume the great quantities of it that are annually imported here. The negroes diſſolve it in milk, and in that ſtate make it a principal ingredient in many of their diſhes; and often feed on it thus alone.

GUM TRAGACANTH. See TRAGACANTH.

GUM MANNA. See the article MANNA.

Other ſubſtances known by the name of gums, are as follow.

GUM ALOES, a preparation of aloes, as ſet down in the London Diſpenſatory. See the article ALOE.

It is made thus: Take of ſuccotrine aloes, four ounces; of water, a quart: boil the aloes till it is diſſolved as much as may be; and ſet all by for a night: the reſin will be precipitated to the bottom of the veſſel; the liquor, poured off or ſtrained, being evaporated, will leave the gum. The intention of this ſeparation of the reſin, is to procure, in the gum, a medicine leſs purgative, but more agreeable to the ſtomach, than the crude aloes.

GUM AMMONIAC. See the article *Gum* AMMONIAC.

GUM ANIME. See *Gum* ANIME.

GUM ELEMI. See the article ELEMI.

GUM GUAIACUM. See GUAIACUM.

GUM LACCA. See the article LACCA.

It may be obſerved in general, that gums and inſpiſſated juices are the better, the freer they are from mixture and droſs; but that they are ſeldom fit for uſe before ſtraining.

Gum, among gardeners, a kind of gangrene incident to fruit trees of the ſtone-kind, ariſing from a corruption of the ſap, which, by its viſcidity, not being able to make its way through the fibres of the tree, is, by the protruſion of other juice, made to extravaſate and ouze out upon the bark.

When the diſtemper ſurrounds the branch, it admits of no remedy, but when only on one part of a bough, it ſhould be taken off to the quick, and ſome cow-dung clapped on the wound, covered over with a linen-cloth, and tied down. M. Quintinie directs to cut off the morbid branch two or three inches below the part affected.

Gum boils *Parulides*, See Parulides.

Gums, *gingivæ*, in anatomy. See the article Gingivæ.

GUN, a fire-arm, or weapon of offence, which forcibly diſcharges a ball, ſhot, or other offenſive matter, through a cylindrical barrel, by means of gun-powder. See the article Gun-powder.

Gun is a general name, under which are included divers or even moſt ſpecies of fire-arms. They may be divided into great and ſmall.

Great guns, called alſo by the general name cannons, make what we alſo call ordnance, or artillery; under which come the ſeveral ſorts of cannons, as cannon-royal, demi-cannon, &c. Culverins, demi-culverins, ſakers, minions, falcons, &c. See Cannon, Culverin, &c. as alſo Ordnance and Artillery.

Small guns include muſquets, muſquetoons, carabines, blunderbuſſes, fowling-pieces, &c. See Musquet, &c.

Piſtols and mortars are almoſt the only ſort of regular weapons, charged with gun-powder, that are excepted from the denomination of guns. See the articles Pistol and Mortar.

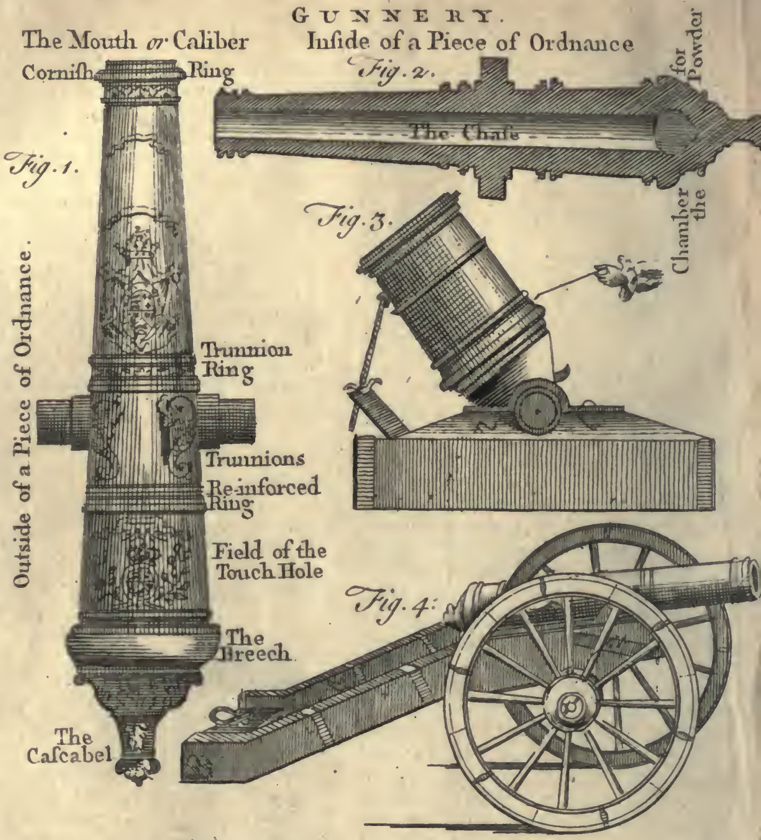
We have given the proportions and uſes of theſe fire-arms, under their reſpective articles; but that their parts may be the more diſtinctly comprehended, there is delineated in the plate of gunnery (CXXII.) fig. 1. a view of the outſide of a piece of ordnance, with the names of its parts; fig. 2. *ibid.* ſhews the chaſe or bore, and the thickneſs of the metal; fig. 4. is a cannon mounted on its carriage; and fig. 3. is a mortar mounted on its carriage.

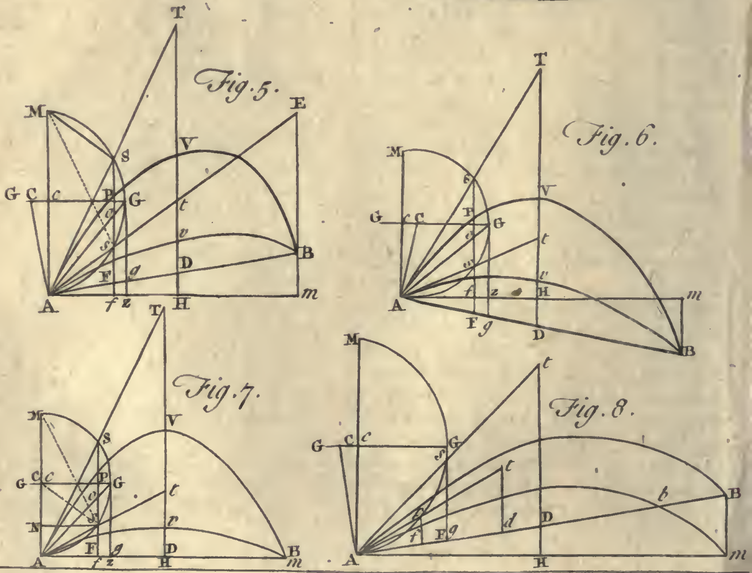
The advantage of large guns, or cannons, over thoſe of a ſmaller bore, is generally acknowledged. Robins obſerves that this advantage ariſes from ſeveral circumſtances, particularly in diſtant cannonading. The diſtance to which larger bullets fly with the ſame proportion of powder, exceeds the flight of the ſmaller ones, almoſt in proportion to their diameters; ſo that a thirty-two pound ſhot, for inſtance, being ſomewhat more than ſix inches in diameter, and a nine-pound ſhot but four inches, the thirty-two pound ſhot will fly near half as far again as that of nine pound, if both pieces are ſo elevated as to range to the fartheſt diſtance poſſible. Another and more important advantage of heavy bullets is, that with the ſame velocity they break holes in all ſolid bodies, in a greater proportion than their weight. Finally, large cannons, by carrying the weight of their bullet in grape or lead-ſhot, may annoy the enemy more effectually than could be done by ten times the number of ſmall pieces. See the article Gunnery.

The author here quoted, has propoſed to change the fabric of all the pieces employed in the britiſh navy, from the twenty-four pounders downwards, ſo that they may have the ſame or leſs weight, but a larger bore. He thinks the thirty-two pounders in preſent uſe would be proper models for this purpoſe. Theſe being of fifty-two or fifty-three hundred weight, have ſomewhat leſs than a hundred and two thirds for each pound of bullet. And that this proportion would anſwer in ſmaller pieces, in point of ſtrength, ſeems clear from theſe conſiderations: 1. That the ſtrength of iron, or any other metal, is in proportion to its ſubſtance. 2. That the leſſer quantity of powder fired in a ſpace it fills, has proportionably leſs force than a larger quantity; ſo that if two pieces, a large and a ſmall one, be made in the ſame proportion to their reſpective bullets, and fired with a proportionable quantity of powder, the larger piece will be more ſtrained, will heat more, and recoil more than the ſmaller.

On this ſcheme our preſent twenty-four pounders will be eaſed of ſix or eight hundred weight of uſeleſs metal; and ſome pieces of a leſs calibre, as nine and ſix pounders, would be ſometimes eaſed by fourteen hundred: hence much larger guns, of the ſame weight, might be borne. Thus, inſtead of ſix, nine, twelve, and eighteen pounders, our ſhips might carry twelve, eighteen, and twenty-four

GUNNERY.





T. Jefferys sculp

pounders: guns would be kept cooler and quieter, and would be of more ſervice, in many reſpects, if their uſual charge of powder were diminiſhed.

Gun is alſo a name given to an inſtrument uſed by miners in cleaving rocks with gun-powder. It is an iron cylinder of an inch and a half thick, and about ſix inches long; and having a flat ſide to receive the ſide of a wedge; and a hole drilled through it to communicate with the inſide of the hole in the rock: this hole is made about eight inches deep, and in the bottom of it is put about two or three ounces of gun-powder: then this gun is driven forcibly in, ſo as to fill up the hole, and the wedge is driven in on its flat ſide to ſecure it.

The priming at the hole is then fired by a train, and the orifice being ſo well ſtopped by this gun, the force of the powder is determined to the circumadjacent parts of the rock, which it ſplits. See the article Mining.

Gun-room, in a ſhip, the apartment under the great cabin, where the maſter-gunner and his crew rendezvous, get ready their cartridges, *&c.* and do all things belonging to their buſineſs.

GUNDELIA, in botany, a genus of the ſyngeneſia-polygamia-æqualis claſs of plants, the compound flower of which is tubulated and uniform, with the hermaphrodite corollulæ equal; the partial flower is monopetalous and clavated, with a ventricoſe, quinquifid, erect limb; there is no pericarpium; the ſeeds, which are ſolitary, roundiſh, acuminated, and coronated with an obſolete margin, are perfectly immerſed and hid in the receptacle: the common receptacle is conic, and covered every where with partial ones, divided with tricuſpidated paleæ; the partial receptacle is conico-obtuſe, quadrangular, and truncated.

GUNELLUS, in ichthyology, a ſpecies of blennius, called alſo the butter-fiſh, with about ten black ſpots beſide the back-fin.

GUNNER, an officer appointed for the ſervice of the cannon; or one ſkilled to fire the guns.

In the Tower of London, and other garriſons, as well as in the field, this officer carries a field ſtaff, and a large powder horn in a ſtring over his left ſhoulder: he marches by the guns, and when there is any apprehenſion of danger, his field ſtaff is armed with match: his buſineſs is to lay the gun to paſs, and to help to load and traverſe her.

Gunner of a ſhip, or maſter gunner, has the charge of all the ordnance the ſhip carries, to ſee that they be serviceably mounted, and ſufficiently ſupplied with ſpunges, ladles, and rammers; that in foul weather they be traverſed within board, eſpecially thoſe of the lower tire, and that the parts be ſhut, and caulked up; and that at all times they may be well laſhed, and made faſt, leſt any of them break looſe, to the imminent danger of foundering the ſhip. In the time of an engagement, the gunner is to ſee that every piece be ſufficiently manned: he is anſwerable to give an account of all his charge upon demand. He has a mate and quarter-gunners for his aſſiſtance.

Maſter **Gunner**, a patent-officer of the ordnance, who is appointed to teach all ſuch as learn the art of gunnery, and to certify to the maſter-general the ability of any perſon recommended to be one of the king's gunners. To every ſcholar he adminiſters an oath, not to ſerve, without leave, any other prince or ſtate; or teach any one the art of gunnery, but ſuch as have taken the ſaid oath.

Gunner's level. See the article Level.

GUNNERY, is the art of determining the courſe and directing the motion of bodies ſhot from artillery, or other warlike engines.

The great importance of this art is the reaſon it is diſtinguiſhed from the doctrine of projectiles in general: for it is no more than an application of thoſe laws which all bodies obſerve when caſt into the air, to ſuch as are put in motion by the exploſion of guns or other engines of that ſort. And it is the ſame thing whether it is treated in the manner of projectiles in general, or of ſuch only as belong to gunnery; for from the moment the force is impreſſed, all diſtinction with regard to the power which put the body firſt in motion is loſt, and it can only be conſidered as a ſimple projectile. See the article Projectiles.

Prob. I. The impetus of a ball, and the horizontal diſtance of an object aimed at, with its perpendicular height or depreſſion, if thrown on aſcents or deſcents, being given, to determine the direction of that ball.

From the point of projection A (plate CXXII. fig. 5, 6, 7, 8) draw A *m* repreſenting the horizontal diſtance, and B *m* the perpendicular height of the object aimed at; Biſect A *m* in H, and

A H in f; on H and f erect H T, fF perpendicular to the horizon, and biſecting A B the oblique diſtance or inclined plane in D, and A D in F. On A raiſe the impetus A M at right angles with the horizon, and biſect it perpendicularly in c, with the line G G. Let the line A C be normal to the plane of projection A B, and cutting G G in C; from C as center, with the radius C A, deſcribe the circle A G M cutting if poſſible the line F S in S, s, points equally diſtant from G; lines drawn from A through S, s will be the tangents or directions required.

Continue A S, A s to T, t; biſect D T, D t, in V, v; and draw lines from M to S, s; then the $\angle ASF = \angle MAS = \angle AMs = \angle sAF$; and for the ſame reaſon $\angle AsF = \angle MAs = \angle AMS = \angle SAF$; wherefore the triangles M A S, S A F, sAF are ſimilar, and $AM : As :: As : sF = tv$; conſequently A T is a tangent of the curve paſſing through the points A, v, and B; becauſe $tv = vD$, A D is an ordinate to the diameter T H, and where produced muſt meet the curve in B.

In horizontal caſes (fig. 7.) v is the higheſt point of the curve, becauſe the diameter T v H is perpendicular to the horizon.

When the mark can be hit with two directions (the triangles S A M, sA F being ſimilar) the angle which the loweſt direction makes with the plane of projection is equal to that which the higheſt makes with the perpendicular A M, or $\angle sAF = \angle SAM$. And the angle S A s, comprehended between the lines of direction, is equal to the angle S C G, and is meaſured by the arch S G.

When the points S, s coincide with G, or when the directions A S, A s become A G; (fig. 8.) A B will the greateſt diſtance that can be reached with the ſame impetus on that plane; becauſe S F coinciding with G g the tangent of the circle at G, will cut off A g a fourth part of the greateſt amplitude on the plane A B. The rectangular triangles m A B, c A C are ſimilar, becauſe the angle of obliquity $mAB = cAC$; wherefore $mA : mB :: \frac{1}{2}$ impetus $: cC$, and $mA : AB :: Ac : AC$.

Horizontal projections (*ibid.* fig. 7, 8.) When the impetus is greater than half the amplitude, there are two directions, T A H, and t A H for that amplitude; when equal to it, only one; and when leſs, none at all; and converſely. For in the firſt caſe the line F S cuts the circle in two points S, s, in the ſecond caſe it only touches it, and in the laſt it meets not with it at all; and converſely. When there is but one direction for the amplitude A m, the angle of elevation is 45°; and when the angle of elevation is of 45° A m is the greateſt amplitude for that impetus, and equal to twice the impetus. The impetus remaining the ſame, the amplitudes are in proportion to one another as the ſigns of double the angles of elevation, and converſely. For drawing sN (fig. 7.) parallel and equal to A F a fourth part of the amplitude, and ſuppoſing lines drawn from s to the points C and M, the angle $ACs = 2AMs = 2sAF$; therefore N s, the ſine of A C s, is the ſine of twice the angle s A F; half the impetus being radius.

Whence, at the directions of 15° or 75°, the amplitude is equal to the impetus: for from what has been ſaid, half the impetus being radius, a fourth part of the amplitude is the ſine of twice the angle of elevation; but the ſine of twice 15°, that is, the ſine of 30° is always equal to half the radius; or in this caſe a fourth part of the impetus is equal to a fourth part of the amplitude. From this and the preceding prop. there are two eaſy practical methods for finding the impetus of any piece of ordnance.

The fourth part of the amplitude is a mean proportional between the impetus at the curve's principal vertex and its altitude. For $MN : Ns :: Ns : NA = sF = vD$.

The altitudes are as the verſed ſines of double the angles of elevation, the impetus remaining the ſame. For making half the impetus radius, A N the altitude is the verſed ſine of the angle $ACs =$ twice $\angle sAF$. And alſo, radius : tangent $\angle$ elevation :: $\frac{1}{4}$ amplitude : altitude; that is, $R : \text{tangent} \angle sAf :: Af : fs = Dv$.

Proj. on aſcents and deſcents, fig. 5, 6. If the mark can be hit only with one direction A G, the impetus in aſcents will be equal to the ſum of half the inclined plane and half the perpendicular height, and in deſcents it will be equal to their difference; but if the mark can be reached with two directions, the impetus will be greater than that ſum or difference. For when A G is the line of direction, the $\angle gGA$ being $= MAG = GAg$; $Gg = Ag$, and gz added to or ſubſtracted from both makes G z half the impetus equal to the ſum or difference of Ag a fourth part of the inclined plane, and gz a fourth part of the perpendicular height. In any other direction FP is greater than $Fo = AF$; and Ff added to or ſubſtracted from both, makes fP half the impetus greater than the ſum or difference of AF a fourth part of the inclined plane, and Ff a fourth part of the perpendicular height. Whence if in aſcents the impetus be equal to the ſum of half the inclined plane and half the perpendicular height, or if in deſcents it be equal to their difference, the mark can be reached only with one direction; if the impetus is greater than that ſum or difference, it may be hit with two directions; and if the impetus is leſs, the mark can be hit with none at all.

Prob. II. The angles of elevation, the horizontal diſtance, and perpendicular height being given, to find the impetus. Fig. 5, 6.

From theſe data you have the angle of obliquity, and length of the inclined plane; then as

$As : AM :: S.\angle AMs : S.\angle AsM :: S.\angle sAF : S.\angle MAF$, and $AF : As :: S.\angle MAs : S.\angle MAF$; whence by the ratio of equality, $AF : AM :: \overline{S.\angle sAF \times S.\angle MAs} : \overline{S.\angle MAF \times S.\angle MAF}$, which gives this rule.

Add the log. of AF to twice the logarithmic ſine of the angle MAF; from their ſum ſubſtract the logarithmic ſines of the angles sAF and MAs, and the remainder will give the logarithm of AM the impetus.

When the impetus and angles of elevation are given, and the length of the inclined plane is required, this is the rule. Add the log. of AM to the log. ſines of the angles sAF and MAs; from their ſum ſubſtract twice the log. ſine of $\angle MAF$, and the remainder will give the log. of AF the fourth part of the length of the inclined plane.

If the angle of elevation tAH and its amplitude AB (fig. 8.) and any other angle of elevation tAH is given; to find the amplitude Ab for that other angle, the impetus AM and angle of obliquity DAH remaining the ſame.

Deſcribe the circle AGM, take AF a fourth part of AB, and Af a fourth part of Ab: From the points F, f, draw the lines Fs and fp parallel to AM, and cutting the circle in the points s, p; then $AF : AM :: \overline{S.\angle sAF \times S.\angle MAs} : \overline{S.\angle MAF \times S.\angle MAF}$; and $AM : Af :: \overline{S.\angle MAF \times S.\angle MAF} : \overline{S.\angle pAf \times S.\angle pAM}$; whence by the ratio of equality,

$AF : Af :: \overline{S.\angle sAF \times S.\angle MAs} : \overline{S.\angle pAf \times S.\angle pAM}$, which gives this Rule.

Add the log. of AF to the log. ſines of the angles pAf, pAM; from their ſum ſubſtract the log. ſines of the angles sAF, sAM, and the remainder will give the log. of Af, a fourth part of the amplitude required.

Prob. III. To find the force or velocity of a ball or projectile at any point of the curve, having the perpendicular height of that point, and the impetus at the point of projection given. From theſe two data find out the impetus at that point; then 2 × 16 feet 1 inch is the velocity acquired by the deſcent of a body in a ſecond of time; the ſquare of which (4 × □ 16 feet 1 inch) is to the ſquare of the velocity required, as 16 feet 1 inch is to the impetus at the point given; wherefore multiplying that impetus by four times the ſquare of 16 feet 1 inch, and dividing the product by 16 feet 1 inch, the quotient will be the ſquare of the required velocity; whence this rule. Multiply the impetus by four times 16 feet 1 inch, or 64 feet $\frac{1}{3}$, and the ſquare root of the product is the velocity.

Thus ſuppoſe the impetus at the point of projection to be 3000, and the perpendicular height of the other point 100; the impetus at that point will be 2900. Then 2900 feet multiplied by 64 $\frac{1}{3}$ feet gives 186566 feet, the ſquare of 432 nearly, the ſpace which a body would run thro' in one ſecond, if it moved uniformly.

And to determine the impetus or height, from which a body muſt deſcend, ſo as at the end of the deſcent it may acquire a given velocity, this is the rule:

Divide the ſquare of the given velocity (expreſſed in feet run through in a ſecond) by 64 $\frac{1}{3}$ feet, and the quotient will be the impetus.

The duration of a projection made perpendicularly upwards, is to that of a projection in any other direction whoſe impetus is the ſame, as the ſine complement of the inclination of the plane of projection (which in horizontal projections is radius) is to the ſine of the angle contained between the line of direction and that plane.

Draw out At (fig. 5.) till it meets mB

continued in E, the body will reach the mark B in the ſame time it would have moved uniformly through the line A E; but the time of its fall through M A the impetus, is to the time of its uniform motion thro' A E, as twice the impetus is to A E. And therefore the duration of the perpendicular projection being double the time of its fall, will be to the time of its uniform motion through A E; as four times the impetus is to A E; or as A E is to E B; that is, as A *t* is to *t* D; which is as the ſine of the angle *t* D A (or M A B its complement to a ſemicircle) is the ſine of the angle *t* A D.

Hence the time a projection will take to arrive at any point in the curve, may be found from the following data, *viz.* the impetus, the angle of direction, and the inclination of the plane of projection, which in this caſe is the angle the horizon makes with a line drawn from the point of projection to that point.

Hence alſo in horizontal caſes, the durations of projections in different directions with the ſame impetus, are as the ſines of the angles of elevation. But in aſcents or deſcents their durations are as the ſines of the angles which the lines of direction make with the inclined plane. Thus, ſuppoſe the impetus of any projection were 4500 feet; then 16 feet 1 inch : 1″ : : 4500 feet : 275″ the ſquare of the time a body will take to fall perpendicularly thro' 4500 feet, the ſquare root of which is 16″ nearly, and that doubled gives 32″ the duration of the projection made perpendicularly upwards. Then to find the duration of a horizontal projection at any elevation, as 20°; ſay R : S. $\angle$ 20° : : 32″ : Duration of a projection at that elevation with the impetus 4500. Or if with the ſame impetus a body at the direction of 35° was projected on a plane inclined to the horizon 17°, ſay as ſine 73° : ſine 18° : : 32″ : duration required.

The two following tables, at one view, give all the neceſſary caſes as well for ſhooting at objects on the plane of the horizon, with proportions for their ſolutions, as for ſhooting on aſcents and deſcents.

TABLE I. For Horizontal Projections. Fig. 7.

Caſes.	Given.	Required.	Proportions.
1	A M, A *m*	*t* A H H *v*	$2AM : Am :: R : S.\ 2\angle tAH$ $R : T.\angle tAH :: \frac{Am}{4} : Hv$
2	A M, *t* A H	A *m*	$R : S.\ 2\angle tAH :: 2AM : Am.$
3	A *m*, *t* A H	A M	$S.\ 2\angle tAH : R :: \frac{Am}{2} : AM$
4	A M, H *v*	A *m*	$\sqrt{AN \times NM} = \frac{Am}{4}$, or $\frac{1}{2}$ Log. AN + $\frac{1}{2}$ Log. NM = Log. $\frac{1}{4}$ A *m*.
5	A *m*, H *v*	*t* A H A M	$\frac{Am}{4} : Hv :: R : T.\ \angle tAH.$ $AN : \frac{Am}{4} :: \frac{Am}{4} : NM$, and $AN + NM = AM.$
6	H *v*, *t* A H	A *m*	$T.\angle tAH : R :: Hv : \frac{Am}{4}$
7	*t* A H, A *m* and any other angle. any other amplitude.	any other amplitude belonging to that angle. any other angle belonging to that amplitude.	S. 2 $\angle$ *t* A H : S, 2 any other $\angle$: : A *m* : amplitude required. A *m* : any other amplitude : : S. 2 $\angle$ *t* A H : S. 2 $\angle$ required.
8	*t* A H, H *v*, any other angle any other altitude.	any other altitude. any other angle.	V. S. 2 $\angle$ *t* A H : V. S. 2 any other $\angle$: : H *v* : altitude required. H *v* : any other altitude : : V. S. 2 $\angle$ *t* A H : V. S. 2 $\angle$ required.

TABLE II. For Projections on Aſcents and Deſcents. Fig. 5, 6.

Caſes.	Given.	Required.	Proportions.
1	AM, A*m*, B*m*, AB.	TAH, *t*AH.	$Am : Bm :: R : T.\angle BAm$, half of which added to 45°, gives $\angle GAz$. $AM : AB :: Ac : AC = CG$. $T.\angle GAz : R :: Gz : Az$, and $Az - Af = fz = PG$. $CG : PG :: R$: V. S. of SG, half of which added to, or taken from GAz, gives the higher or lower direction required.
2	TAH, *t*AH, AF	AM	$\text{Log. of } AM = \text{Log. of } AF + 2\ \text{Log. S.} \angle MAF - \text{Log. S.} \angle sAF - \text{Log. S.} \angle MAs$.
3	TAH, *t*AH, AM	AF	$\text{Log. of } AF = \text{Log. } AM + \text{Log. S.} \angle sAF + \text{Log. S.} \angle MAs - 2\ \text{Log. S.} \angle MAF$.
4	BA*m*, *t*AH, AB, and any other angle *t*AH	A*b* the amplitude for that other angle.	Fig. 8. $\text{Log. } Af = \text{Log. } AF + \text{Log. S.} \angle pAf + \text{Log. S.} \angle pAM - \text{Log. S.} \angle sAF - \text{Log. S.} \angle MAs$.
5	AM, DAH	A*g*	Fig. 5, 6. $T.\angle GAz : \text{Sec.} \angle gAz :: Gz : Ag$.

GUN-POWDER, a compoſition of ſaltpetre, ſulphur, and charcoal, mixed together, and uſually granulated; which eaſily takes fire, and, when fired, rarifies, or expands, with great vehemence, by means of its elaſtic force.

It is to this powder we owe all the action and effect of guns, ordnance, &c. ſo that the modern military art, fortification, &c. in great meaſure depend thereon.

Method of making GUN-POWDER. Dr. Shaw's recipe for this purpoſe is as follows. Take four ounces of refined ſaltpetre, an ounce of brimſtone, and ſix drams of ſmall coal: reduce theſe to a fine powder, and continue beating them for ſome time in a ſtone mortar, with a wooden peſtle, wetting the mixture between whiles with water, ſo as to form the whole into an uniform paſte, which is reduced to grains, by paſſing it thro' a wire-ſieve fit for the purpoſe; and in this form being carefully dried, it becomes the common gun powder.

For greater quantities, mills are uſually provided, by means of which more work may be performed in one day, than a man can do in a hundred. See MILL.

The nitre or ſaltpetre is refined thus: diſſolve four pounds of rough nitre as it comes to us from the Indies, by boiling it in as much water as will commodiouſly ſuffice for that purpoſe: then let it ſhoot for two or three days in a covered veſſel of earth, with ſticks laid acroſs for the cryſtals to adhere to. Theſe cryſtals being taken out, are drained and dried in the open air.

In order to reduce this ſalt to powder, they diſſolve a large quantity of it in as ſmall a proportion of water as poſſible; then keep it conſtantly ſtirring over the fire, till the water exhales, and a white, dry powder is left behind. See NITRE.

In order to purify the brimſtone employed, they diſſolve it with a very gentle heat; then ſcum and paſs it through a double ſtrainer. If the brimſtone ſhould happen to take fire in the melting, they have an iron cover that fits on cloſe to the melting veſſel, and damps the flame. The brimſtone is judged to be ſufficiently refined if it melts without yielding any fetid odour between two hot iron plates into a kind of red ſubſtance.

The coal for the making of gun-powder is either that of willow, or hazel, well charred in the uſual manner, and reduced to powder. And thus the ingredients are prepared for making this commodity;

modity: but as theſe ingredients require to be intimately mixed, and as there would be danger of their firing if beat in a dry form, the method is to keep them continually moiſt, either with water, urine, or a ſolution of ſal armoniac: they continue thus ſtamping them together for twenty-four hours, after which the maſs is fit for corning and drying in the ſun, or otherwiſe, ſo as ſedulouſly to prevent its firing.

Rationale of GUN-POWDER. The exploſive force of gun-powder is now a thing commonly known, but the phyſical reaſon thereof may not perhaps be hitherto ſufficiently underſtood. In order to explain it, Dr. Shaw propoſes the following obſervations, 1. That ſalt petre of itſelf is not inflammable, and though it melts in the fire, and grows red-hot, yet does not explode, unleſs it comes in contact with the coals. 2. That brimſtone eaſily melts at the fire, and eaſily catches flame. 3. That powdered charcoal readily takes fire, even from the ſparks yielded by a flint and ſteel. 4. That if nitre be mixed with powdered charcoal, and brought in contact with the fire, it burns and flames. 5. That if ſulphur be mixed with powdered charcoal, and applied to the fire, part of the ſulphur burns ſlowly away, but not much of the charcoal; and, 6. That if a lighted coal be applied to a mixture of nitre and ſulphur, the ſulphur preſently takes fire with ſome degree of exploſion; leaving part of the nitre behind, as we ſee in making the ſal prunellæ, and ſal polychreſtum.

Theſe experiments duly conſidered, adds the doctor, may give us the chemical cauſe of the ſtrange exploſive force of gun-powder. For each grain of this powder conſiſting of a certain proportion of ſulphur, nitre, and coal, the coal preſently takes fire, upon contact of the ſmalleſt ſpark: at which time both the ſulphur and the nitre immediately melt, and by means of the coal interpoſed between them, burſt into flame; which, ſpreading from grain to grain, propagates the ſame effect almoſt inſtantaneouſly: whence the whole maſs of powder comes to be fired; and as nitre contains both a large proportion of air and water, which are now violently rarified by the heat, a kind of fiery exploſive blaſt is thus produced, wherein the nitre ſeems, by its aqueous and aerial parts, to act as bellows to the other inflammable bodies, ſulphur and coal, to blow them into a flame, and carry off their whole ſubſtance in ſmoke and vapour.

Different kinds of GUN-POWDER. The three ingredients of gun-powder are mixed in various proportions according as the powder is intended for muſquets, great guns or mortars; though theſe proportions ſeem not to be perfectly adjuſted, or ſettled by competent experience.

Semienowitz for mortars, directs 100 ℔ of ſalt-petre, 25 ℔ of ſulphur, and as many of charcoal; for great guns, 100 ℔ ſalt-petre, 15 ℔ of ſulphur, and 18 ℔ of charcoal; for muſquets and piſtols 100 ℔ of ſalt-petre, 8 ℔ of ſulphur, and 10 lb. of charcoal. Miethius extols the proportion of 1 lb. of ſalt-petre to three ounces of charcoal, and two, or two and a quarter of ſulphur; than which, he affirms, no gun-powder can poſſibly be ſtronger. He adds, that the uſual practice of making the gun-powder weaker for mortars than guns, is without any foundation, and renders the expence needleſsly much greater: for whereas to load a large mortar, 24 lb. of common powder is required, and conſequently to load it ten times 240 lb. he ſhews by calculation, that the ſame effect would be had by 150 lb. of the ſtrong powder.

To increaſe the ſtrength of powder, Dr. Shaw thinks it proper to make the grains conſiderably large, and to have it well ſifted from the ſmall duſt. We ſee that gun-powder, reduced to duſt, has little exploſive force; but when the grains are large, the flame of one grain has a ready paſſage to another, ſo that the whole parcel may thus take fire nearly at the ſame time, otherwiſe much force may be loſt, or many of the grains go away as ſhot unfired.

It ſhould alſo ſeem that there are other ways of increaſing the ſtrength of powder, particularly by the mixture of ſalt of tartar; but perhaps, adds the laſt-mentioned author, it were improper to divulge any thing of this kind, as gun-powder ſeems already ſufficiently deſtructive.

Method of trying and examining GUN-POWDER. There are two general methods of examining gun-powder; one with regard to its purity, the other with regard to its ſtrength. Its purity is known by laying two or three little heaps near each other upon white paper, and firing one of them; for if this takes fire readily, and the ſmoke riſes upright without leaving any droſs, or feculent matter behind, and without burning the paper, or firing the other heaps, it is eſteemed a ſign that the ſulphur and nitre were well purified, that the coal was good, and that the three ingredients were thoroughly incorporated together: but if the other heaps alſo take fire at the ſame time, 'tis preſumed that either common ſalt was mixed with the nitre, or that the coal was not well ground, or the whole maſs not well beat, and mixed together; and if either the nitre or ſulphur be not well purified, the paper will be black or ſpotted.

In order to try the ſtrength of gun-powder, there are two kinds of inſtruments in uſe; but neither of them appear more exact than the common method of trying to what diſtance a certain weight of powder will throw a ball from a muſquet.

There has been much talk of a white powder which, if it anſwered the character given it, might be a dangerous compoſition: for they pretend that this white powder will throw a ball as far as the black, yet without making a report; but none of the white powder we have ſeen, ſays Dr. Shaw, anſwers to this character; being, as we apprehend, commonly made either with touchwood or camphor, inſtead of coal.

Obſervations on the force of GUN-POWDER.

Gun-powder fired either in vacuum, or in air, produces by its exploſion a permanent elaſtic fluid. For if a red-hot iron be included in a receiver, after being exhauſted, and gun-powder be let fall on the iron, the powder will take fire, and the mercurial gage will ſuddenly deſcend upon the exploſion; and though it immediately aſcends again, yet it will never riſe to the height it firſt ſtood at, but will continue depreſſed by a ſpace proportioned to the quantity of gun-powder which was let fall on the iron.

The ſame production likewiſe takes place, when gun powder is fired in the air: for if a ſmall quantity of powder be placed in the upper part of a glaſs tube, and the lower part of the tube be immerged in water, and the water be made to riſe ſo near the top, that only a ſmall portion of air is left in that part where the gun-powder is placed; if in this ſituation the communication of the upper part of the tube with the external air be cloſed, and the powder be fired, which will eaſily be done by a burning-glaſs, the water will in this experiment deſcend upon the exploſion as the quickſilver did in the laſt; and will always continue depreſſed below the place at which it ſtood before the exploſion; and the quantity of this depreſſion will be greater, if the quantity of powder be increaſed, or the diameter of the tube be diminiſhed. From whence it is proved, that as well in air as in a vacuum, the exploſion of fired powder produces a permanent elaſtic fluid. It alſo appears from experiment, that the elaſticity or preſſure of the fluid produced by the firing of gun-powder, is, *cæteris paribus*, directly as its denſity. This follows from hence, that if in the ſame receiver a double quantity of powder be let fall, the mercury will ſubſide twice as much as in the firing of a ſingle quantity. To determine the elaſticity and quantity of this elaſtic fluid, produced from the exploſion of a given quantity of gun-powder, Mr. Robins premiſes, that the elaſticity of this fluid increaſes by heat, and diminiſhes by cold in the ſame manner as that of the air; and that the denſity of this fluid, and conſequently its weight, is the ſame with the weight of an equal bulk of air having the ſame elaſticity, and the ſame temperature. From theſe principles, and from his experiments, for a detail of which we muſt refer the reader to his New Principles of Gunnery, in Scholium, to prop. II. he concludes, that the fluid produced by the firing of gun-powder will be $\frac{3}{10}$ of the weight of the gun-powder, and the ratio of the reſpective bulks of the powder, and the fluid produced from it, will be in round numbers 1 to 244.

Hence we are certain, that any quantity of powder fired in any confined ſpace, which it adequately fills, exerts, at the inſtant of its exploſion, againſt the ſides of the veſſel containing it, and the bodies it impels before it, a force at leaſt 244 times greater than the elaſticity of common air; or which is the ſame thing, than the preſſure of the atmoſphere; and this without conſidering the great addition which this force will receive from the violent degree of heat with which it is endued at that time, the quantity of which augmentation is the next head of Mr. Robins's enquiry. He determines that the elaſticity of the air is augmented when heated to the extremeſt heat of red hot iron, in the proportion of 796 to $194\frac{1}{3}$, and ſuppoſing that the flame of fired gun-powder is not leſs hot than red hot iron, and the elaſticity of the air, and conſequently of the fluid, generated by the exploſion, being augmented by the extremity of this heat in the ratio of 796 to $194\frac{1}{3}$, it follows that if 244 be augmented in this ratio, the reſulting number which is $999\frac{1}{3}$ will determine how many times the elaſticity of the flame of fired powder exceeds the elaſticity of common air, ſuppoſing it to be confined in the ſame ſpace, which the powder filled before it was fired.

Hence then the abſolute quantity of the preſſure exerted by gun-powder, at the moment of its exploſion may be aſſigned: for ſince the fluid then generated has an elaſticity of $999\frac{1}{3}$, or in round numbers 1000 times greater than common air; and ſince common air by its elaſticity exerts a preſſure on any given ſurface equal to the weight of the incumbent atmoſphere, with which it is in equilibrio, the preſſure exerted by fired powder, before it has dilated itſelf, is 1000 times greater than the preſſure of the atmoſphere; and conſequently the quantity of this force on a ſurface of an inch ſquare, amounts to above ſix tun weight, which force however diminiſhes as the fluid dilates itſelf. The variation of the denſity of the atmoſphere does not any way alter the action of powder by any experiment that can be made. But the moiſture of the air has a very great influence on the force of it: for that quantity which in a dry ſeaſon would communicate to a bullet a velocity of 1700 feet in one ſecond, will not in damp weather communicate a velocity of more than 12 or 1300 feet in a ſecond, or even leſs, if the powder be bad and negligently kept.

The velocity of expanſion of the flame of gun-powder when fired in a piece of artillery, without either bullet, or any other body before it, is prodigious. By the experiments of Mr. Robins, it ſeems this velocity cannot be much leſs than 7000 feet in a ſecond. This, however, muſt be underſtood of the moſt active part of the flame. For as was obſerved before, the elaſtic fluid in which the activity of gun-powder conſiſts, is only $\frac{3}{10}$ of the ſubſtance of the powder, the remaining $\frac{7}{10}$ will in the exploſion be mixed with the elaſtic part, and will by its weight retard the activity of the exploſion; and yet they will be ſo compleatly united as to move with uncommon motion; but the unelaſtic part will be leſs accelerated than the reſt, and ſome of it will not even be carried out of the barrel, as appears by the conſiderable quantity of unctuous matter, which adheres to the inſide of all fire-arms, after they have been uſed. Theſe inequalities in the expanſive motion of the flame render it impracticable to determine its velocity, otherwiſe than from experiments.

To recover damaged GUN-POWDER. The method of the powder-merchants is this; they put part of the powder on a ſail-cloth, to which they add an equal weight of what is really good, and with a ſhovel mingle it well together; dry it in the ſun, and barrel it up, keeping it in a dry and proper place. Others again, if it be very bad, reſtore it by moiſtening it with vinegar, water, urine, or brandy: then they beat it fine, ſearce it, and to every pound of powder add an ounce, an ounce and a half, or two ounces, according as it is decayed, of melted ſalt-petre. Afterwards, theſe ingredients are to be moiſtened and mixed well, ſo that nothing can be diſcerned in the compoſition, which may be known by cutting the maſs; and then they granulate it as aforeſaid. In caſe the powder be in a manner quite ſpoiled, the only way is to extract the ſalt-petre with water, according to the uſual manner, by boiling, filtrating, evaporating, and cryſtallizing; and then with freſh ſulphur and charcoal to make it up a-new again.

In regard to the medical virtues of gun-powder, Boerhaave informs us, that the flame of it affords a very healthy fume in the height of the plague: becauſe the exploſive acid vapour of nitre and ſulphur corrects the air; and that the ſame vapour, if received in a ſmall cloſe pent up place, kills inſects.

It is enacted by 5 and 11 of Geo. I. and 5 Geo. II. *c.* 20, that gun-powder be carried to any place in covered carriages; the barrels being cloſe jointed; or in caſes, and bags of leather, *&c.* And perſons keeping more than 200 pounds weight of gun-powder, at one time, within the cities of London and Weſtminſter, or the ſuburbs, *&c.* are liable to forfeitures if it be not removed; and juſtices of peace may iſſue warrants to ſearch for, ſeize, and remove the ſame.

The invention of gun-powder is aſcribed by Polydore Virgil to a chymiſt, who having accidentally put ſome of the ingredients

gredients in this compoſition in a mortar, and covered it over with a ſtone, it happened to take fire, and blew up the ſtone. Thevet ſays, the perſon here ſpoken of was a monk of Friburgh, named Conſtantine Anelzen; but Belleforet and others hold it to be Bartholdus Schwartz, or the black; at leaſt it is affirmed, that he firſt taught the uſe of it to the Venetians, in the year 1380, during the war with the Genoeſe. But what contradicts this account, and ſhews gun-powder to be of an older date, is, that Peter Mexia, in his Variæ Lectiones, relates, that Alphonſus XI. king of Caſtile uſed mortars againſt the Moors in a ſiege in 1343. Ducange adds, that there is mention made of this powder in the regiſters of the chambers of accounts in France, as early as the year 1338, and Frier Bacon, our country-man, mentions the compoſition in expreſs terms, in his treatiſe De nullitate magiæ, publiſhed at Oxford, in the year 1216.

GUN-SHOT-WOUNDS, are attended with much worſe conſequences than wounds made by ſharp inſtruments; for the parts are more ſhattered and torn, eſpecially when the ſhot falls upon the joints, bones, or any conſiderable part.

In treating theſe wounds, the following rules muſt be obſerved; to extract all foreign bodies, to ſtop the hæmorrhage, to promote ſuppuration, to encourage new fleſh, and to make an even cicatrix. The extraction of foreign bodies ſhould, if poſſible, be performed with the hand; or if that cannot be done, with the forceps or a hook. They are eaſieſt removed at firſt; for, after ſome delay, the tumour and inflammation of the parts, render it difficult and painful. Sometimes the orifice of the wound is ſo narrow, that it will be impoſſible to come at the body you have a deſire to extract, without making a larger opening; which ſhould be done on the moſt convenient ſide, always obſerving that no nerve, blood-veſſel, tendon, or ligament lies in the way. And as two balls are frequently concealed in the ſame wound, after the removal of one, the ſurgeon ſhould diligently ſearch for another, or for any other extraneous body that may be forced in with it, which might protract the cure of the wound. When an attempt is made to extract the ball, or any other extraneous body, the patient ſhould be laid in the ſame ſituation he was in at the time of receiving the wound; for, by frequent changes of ſituation, the ball will eaſily bury itſelf and get out of your reach. Whenever a ball has penetrated ſo deep, that you can eaſily feel it with your finger on the ſide oppoſite to the wound, you ſhould examine nicely whether it is ſafeſt to bring it back by the way it came in, or to make an opening upon it, and draw it out at the oppoſite ſide. If the wound cannot ſafely be enlarged, nor the balls extracted without great pain and danger, they muſt be left in the wound, either till the pain is abated, or the paſſage rendered ſo eaſy by ſuppuration, that they work themſelves out. On the other hand, extraneous bodies are inſtantly to be removed, where there is danger of bringing on convulſions, pain, and an inflammation, by being left behind. If a ball has paſſed into any of the cavities of the body, where the extraction of it cannot be attempted with ſafety, it is beſt to leave it where it has lodged, and to heal the wound: for there have been variety of inſtances, where perſons have carried balls within them for many years, without ſuffering any inconvenience. Balls lodged in the bones, are to be extracted with roſtrated forceps, obſerving the ſame rules and directions we have already laid down. When this cannot be done, they may be laid hold of with a ſort of trepan neceſſary to extract balls that are lodged in bones, and that are covered with a large quantity of fleſh; as in the thigh bone; but if the ball is ſo ſtrongly fixed in the bone, as to reſiſt all theſe methods, it muſt be left there till the parts ſuppurate, and ſet it at liberty. Balls that are thrown into the joints are to be removed with all expedition, for delays are here extremely dangerous; but it is ſcarce poſſible to prevent violent pains, inflammations, and caries of the bones, which generally require amputation of the limb. In wounds from large guns, the joint or bone is frequently grievouſly ſhattered, or carried off; in this caſe, it is far better to take off the limb at once, than to ſpend a great deal of time in fruitleſs attempts to cure it; for the natural figure of the ſhattered joint can never be reſtored, and the branches of nerves that were ſent to the bone, and the inſertion of the tendons and ligaments being torn from it in many places, cannot but bring on violent inflammations and a gangrene; but where the bones are not violently ſhattered and broken, the ſurgeon ſhould be careful in time to remove the ſplinters, and all extraneous bodies, and to treat the wound according to the rules preſcribed above: laſtly, if any large artery is wounded, either in the arms or legs, which will appear by the loſs of blood, the tournequet ſhould be applied, and the blood being ſtopped, you muſt endeavour to take up the veſſel, by the aſſiſtance of the crooked needle; but if this cannot be done, or if the condition of the wound will allow no hopes of ſucceſs from the future dreſſings, it will be proper to take off the limb a little above the wound.

The wound being cleaned, and the blood ſtopped, the firſt intention is to uſe our utmoſt endeavours to prevent or aſſuage the tumour and inflammation. The wound ſhould be dreſſed up with lint dipped in ſpirits of wine warmed, covering it up with compreſſes wet with the ſame liquor, or with camphorated ſpirit of wine, either alone, or diluted with aqua calcis. Having done this, the next intention is to forward the ſuppuration of the bruiſed and torn parts, and then to fill up the wound with new fleſh, neatly cicatrized; for the method of doing which, ſee the articles SUPPURATION and WOUND.

In gun-ſhot wounds, ſeveral grains of powder frequently penetrate the ſkin of the face, and occaſion deformity, if they are not taken out: which may be done with a pin, or an inſtrument like an ear-picker: but if they are got in too deep to be picked out in this manner, the ſkin muſt be laid open with a fine ſmall lancet, in order to get at them with the inſtruments we have deſcribed. Great care ſhould be taken not to break the grains in taking them out; for that will occaſion very foul ſpots.

GUNSTBERG, a town of Germany, in the circle of Swabia, ſituated on the eaſt ſide of the Danube: eaſt long. 10° 15′, north lat. 48° 35′.

GUNTER's LINE, a logarithmic line, uſually graduated upon ſcales, ſectors, *&c.* See SCALE and SECTOR.

It is alſo called the line of lines, and line of numbers; being only the logarithms graduated upon a ruler, which therefore ſerves to ſolve problems inſtrumentally in the ſame manner as logarithms do arithmetically. It is uſually divided into an hundred parts, every tenth thereof is numbered, beginning with 1, and ending with 10; ſo that if the firſt great diviſion, marked 1, ſtand for one tenth of any integer, the next diviſion, marked 2, will ſtand for two tenths; 3, three tenths, and ſo on; and the intermediate diviſions will, in like manner, repreſent 100th parts of the ſame integer. If each of the great diviſions repreſent 10 integers, then will the leſſer diviſions ſtand for integers; and if the great diviſions be ſuppoſed each 100, the ſub-diviſions will be each 10.

Uſe of GUNTER's LINE. 1. *To find the product of two numbers.* From 1 extend the compaſſes to the multiplier; and the ſame extent, applied the ſame way from the multiplicand, will reach to the product. Thus if the product of 4 and 8 be required, extend the compaſſes from 1 to 4, and that extent laid from 8 the ſame way, will reach to 32, their product. 2. *To divide one number by another.* The extent from the diviſor to unity, will reach from the dividend to the quotient: thus to divide 36 by 4, extend the compaſſes from 4 to 1, and the ſame extent will reach from 36 to 9, the quotient ſought. 3. *To three given numbers, to find a fourth proportional.* Suppoſe the numbers 6, 8, 9; extend the compaſſes from 6 to 8, and this extent, laid from 9 the ſame way, will reach to 12, the fourth proportional required. 4. *To find a mean proportional between any two given numbers.* Suppoſe 8 and 32: extend the compaſſes from 8 in the left-hand part of the line, to 32 in the right; then biſſecting this diſtance, its half will reach from 8 forward, or from 32 backward, to 16, the mean proportional ſought. 5. *To extract the ſquare root of any number.* Suppoſe 25: biſſect the diſtance between 1 on the ſcale and the point repreſenting 25; then the half of this diſtance, ſet off from 1, will give the point repreſenting the root 5. In the ſame manner the cube root, or that of any higher power, may be found by dividing the diſtance on the line, between 1 and the given number, into as many equal parts as the index of the power expreſſes; then one of thoſe parts, ſet from 1, will find the point repreſenting the root required.

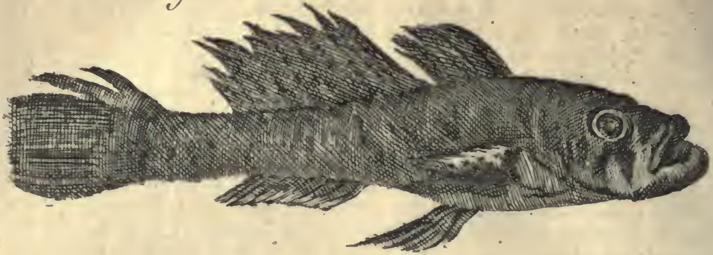
GUNTER's QUADRANT, one made of wood, braſs, *&c.* containing a kind of ſtereographic projection of the ſphere, on the plane of the equinoctial; the eye being ſuppoſed placed in one of the poles.

Beſides the uſe of this quadrant in finding heights and diſtances, it ſerves alſo

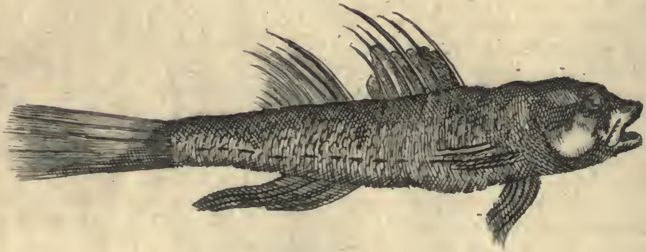
to

facing page 4537 Plate CXXIII

Fig. 1. GOBIUS. *No. 1.*



No. 2.



No. 3.

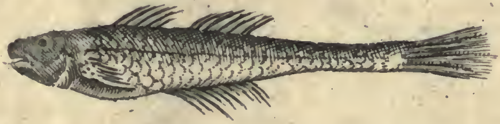
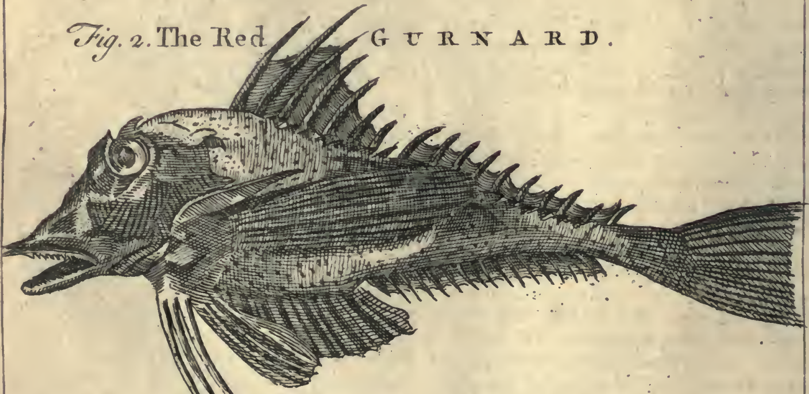


Fig. 2. The Red GURNARD.



T. Jefferys sculp.

to find the hour of the day, the ſun's azimuth, and other problems of the globe. See the article QUADRANT.

GUNTER'S SCALE, called by navigators ſimply the gunter, is a large plain ſcale, generally two feet long, and about an inch and a half broad, with artificial lines delineated on it, of great uſe in ſolving queſtions in trigonometry, navigation, *&c.* See the article SCALE.

GUN-WALE, or GUNNEL, is the uppermoſt wale of a ſhip, or that piece of timber which reaches on either ſide from the quarter-deck to the forecaſtle, being the uppermoſt bend which finiſhes the upper works of the hull, in that part in which are put the ſtanchions which ſupport the waſte-trees.

GURIEL, a ſubdiviſion of Georgia, in Aſia, ſituated on the eaſtern coaſt of the Euxine-ſea.

GURK, a city of Carinthia in Germany: eaſt long. 14°, north lat. 47° 20′.

GURNARD, in ichthyology, the engliſh name of two ſpecies of trigla. See the article TRIGLA.

Theſe fiſhes from their different colours are called the grey and red gurnard. The grey gurnard has a bifid and ſpinoſe ſnout, with two ſpines at each eye. The red kind has likewiſe the roſtium bifid, and the coverings of the gills ſtriated, and each of them armed with three ſpines. This laſt is a very remarkable ſpinoſe fiſh, which ſeldom exceeds a foot in length. See plate CXXIII. fig. 2.

Both theſe fiſhes make a ſingular noiſe, when out of the water, not unlike the grunting of a hog; whence their engliſh name.

GUSSET, in heraldry, is formed by a line drawn from the dexter or ſiniſter chief points, and falling down perpendicularly to the extreme baſe. See plate CXXI. fig. 7.

The guſſet is an abatement of honour, denoting an effeminate perſon. See the article ABATEMENT.

GUSTROW, a town of Germany, in the dutchy of Mecklenburg: eaſt long. 12° 15′, north lat. 54°.

GUTS, or INTESTINES, in anatomy. See the article INTESTINES.

GUTSKROW, a city of Germany, in the circle of Upper Saxony, and province of ſwediſh Pomerania: eaſt long. 13° 40′, north lat. 54°.

GUTTA, a town of Hungary, ſituated on the eaſt ſide of the Danube: eaſt long. 18°, north lat. 48° 20′.

GUTTÆ ANGLICANÆ, volatile engliſh drops. See the article DROPS.

GUTTÆ, in architecture, are ornaments in the form of little cones, uſed in the plafond of the doric corniche, or on the architrave underneath the triglyphs, repreſenting a ſort of drops or bells. They are uſually ſix in number. See the article DORIC.

GUTTA SERENA, a diſeaſe in which the patient, without any apparent fault in the eye, is entirely deprived of ſight.

Its cauſe is aſcribed to an obſtruction of the optic nerve, which may proceed from a palſey in the nerve, from a ſuppreſſion of uſual hæmorrhages, from ulcers healed too ſoon, or from an epilepſy.

Heiſter affirms, that it is to be cured by aromatics, carminatives, and attenuants; chiefly eye-bright, veronica, hyſſop, roſemary-flowers, ſage, fennel and anniſeeds, valerian-root, ſaſſafras, cinnamon and wood-lice, either in infuſion, or in powder. The juice of wood-lice newly expreſſed, and taken for ſome weeks, encreaſing the doſe, is of excellent uſe; as likewiſe mercurials, and ſometimes a ſalivation. If it ariſes from a ſuppreſſion of uſual hæmorrhages, they are to be reſtored; but if this cannot be done, artificial bleeding is to be ſubſtituted.

Coward recommends volatiles, antiſcorbutics, chalybeats, mercurials, cephalics, and nervine medicines.

Externally, iſſues, ſetons, and clyſters, are ſaid to be good, eſpecially in the phlegmatic; but if the patient is plethoric, cupping and bleeding, particularly cauteries, or iſſues on the coronal ſuture, or in the neck, are proper: and the eyes may be waſhed with fennel, valerian, eye-bright, or roſe-water: or an infuſion of fennel-roots in wine, with bags of ſtrengthening herbs and fennel-ſeeds, may be put upon them. Sneezing powders may likewiſe be proper, eſpecially florentine orrice, or horſe-cheſnuts. An old gutta ſerena, however, is generally incurable.

GUTTE′, or GUTTY. See GUTTY.

GUTTERS, in architecture, a kind of canals in the roofs of houſes, ſerving to receive and carry off the rain.

Gutters, with reſpect to their poſition, are of two kinds: ſuch as come ſomething near a paralleliſm with the horizon; and ſuch as incline towards a vertical poſition to the horizon.

GUTTER-TYLES, thoſe intended for gutters. See the article TYLE.

GUTTURAL, a term applied to letters or ſounds pronounced or formed as it were in the throat. There are four guttural letters in the hebrew, *viz.* אהחע, which, for memory's ſake, are termed ahachah. See the article LETTER.

GUTTY, *gutté*, in heraldry, a term uſed when any thing is charged or ſprinkled with drops.

In blazoning, the colour of the drops is to be named, as gutty of ſable, of gules, *&c.*

GUY, in a ſhip, is any rope uſed for keeping off things from bearing or falling againſt the ſhip's ſides when they are hoiſting in.

That rope which at one end is made faſt to the fore-maſt, and ſeized to a ſingle block at the pendant of the garnet, is called the guy of the garnet.

GUY's HOSPITAL. See HOSPITAL.

GUZES, in heraldry, roundles of a ſanguine or murry colour. Theſe, from their bloody hue, are by ſome ſuppoſed to repreſent wounds.

GYMNIA, in zoology, a claſs of animalcules, which have no tails, nor any viſible limbs. See ANIMALCULE.

This claſs comprehends the capillary eels, the pepper-water eel, and the vinegar eel.

GYMNARTHRIA, in zoology, a name given that order of inſects which have ſoft naked bodies, furniſhed with limbs. See the article INSECT.

GYMNASIARCH, γυμνασιαρχης, in antiquity, the director of the gymnaſium. He had two deputies under him; the one called xyſtarch, who preſided over the athletæ, and had the overſight of the wreſtling; the other, gymnaſtes, who had the direction of all the other exerciſes.

GYMNASIUM, γυμνασιον, in grecian antiquity, a place fitted for performing exerciſes.

Gymnaſia, according to Potter, were firſt uſed at Lacedæmon, but were afterwards very common in all parts of Greece, and imitated, very much augmented, and improved at Rome. They were not ſingle edifices, but a knot of buildings united, being ſo capacious as to hold many thouſands of people at once, and having room enough for philoſophers, rhetoricians, and the profeſſors of all other ſciences, to read their lectures; and wreſtlers, dancers, and all others that would, to exerciſe at the ſame time without the leaſt diſturbance or interruption. They conſiſted of a great many parts, the chief of which were the porticos, elæotheſium, palæſtra, coniſterium, *&c.* See the articles PORTICO, ELÆOTHESIUM, *&c.*

Athens had ſeveral gymnaſia, of which the lyceum, academia, and cynoſurges, were thoſe of moſt note.

The lyceum was ſituated upon the banks of the river Iliſſus, and received its name from Apollo λυκοκτονος, or λυκειος, to whom it was dedicated.

The lyceum was the place where Ariſtotle taught philoſophy, walking there every day till the hour of anointing; whence he and his followers got the name of peripatetics, from περιπατειν, to walk.

The academy was part of the ceramicus without the city, where Plato lectured. See the article ACADEMY.

The cynoſurges was a place in the ſuburbs, near the lyceum, ſo called from a white or ſwift dog, κυον αργος. Here Antiſthenes inſtituted a ſect of philoſophers called cynics, from the name of the place.

GYMNASTICS, the art of performing the ſeveral bodily exerciſes, as wreſtling, running, fencing, dancing, *&c.* See the article WRESTLING, *&c.*

That part of medicine which regulates the exerciſes of the body, whether for preſerving or reſtoring health, is alſo termed gymnaſtic.

GYMNIC, ſomething belonging to the athletic exerciſes; for an account of which, ſee the articles PENTATHLON, OLYMPIC, ISTHMIAN, *&c.*

GYMNOPÆDIA, a dance uſed by the antient Lacedæmonians, and performed during their ſacrifices by young perſons naked, who at the ſame time ſung a ſong in honour of Apollo.

GYMNOPYRIS, in natural hiſtory, a name given by Dr. Hill to the pyritæ of a ſimple internal ſtructure, and not covered with a cruſt.

Of theſe there are only two ſpecies. 1. A green variouſly ſhaped kind. 2. A botryoide kind. See PYRITÆ.

The firſt ſpecies is the moſt common of all the pyritæ, and appears under a great diverſity of ſhapes. It is very hard and heavy, very readily gives fire with ſteel, but will not at all ferment with aquafortis. The ſecond ſpecies is very elegant and beautiful, and its uſual colour is a very agreeable pale green; but what moſt diſtinguiſhes it from all other pyritæ is, that its ſurface is always beautifully elevated into tubercles of various ſizes, reſembling a cluſter of grapes. See plate CXXIV. fig. 3.

GYMNOSOPHISTS, a ſect of philoſophers

Fig. 1. GLOSSOPETRÆ.

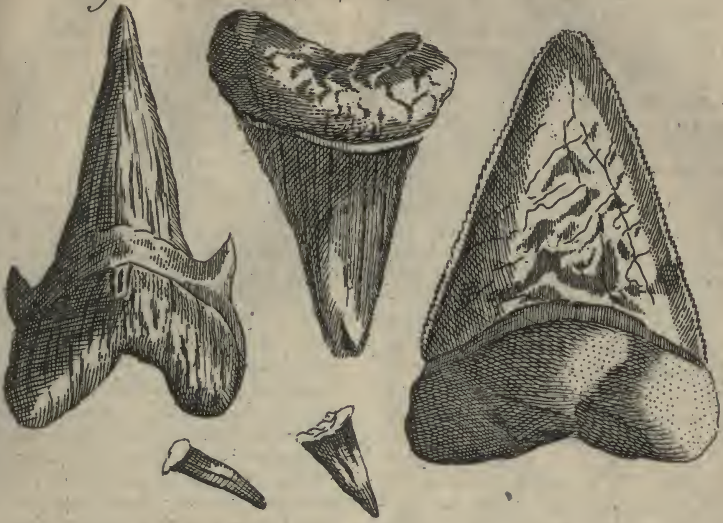


Fig. 2. GRYPHITES.

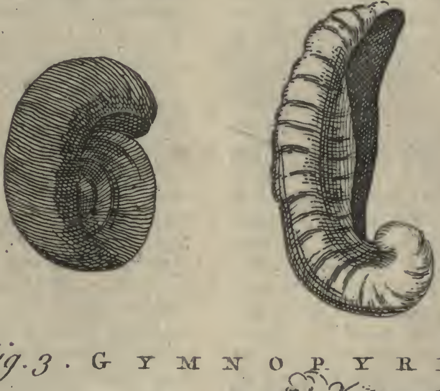
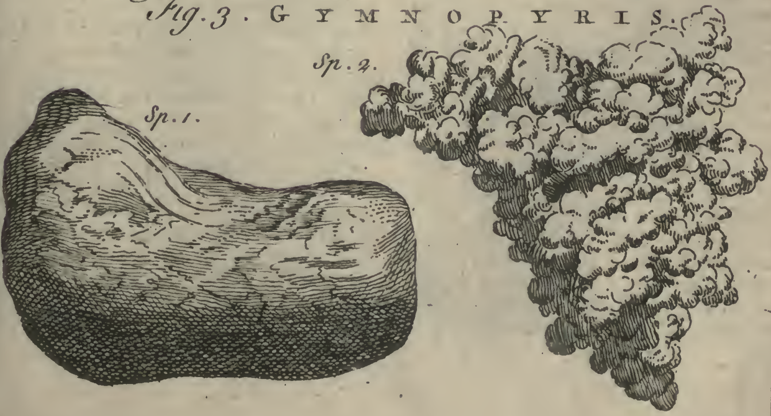


Fig. 3. GYMNOPYRIS.



phers who cloathed themſelves no farther than modeſty required. There was ſome of theſe ſages in Africa; but the moſt celebrated clan of them was in India. The african gymnoſophiſts dwelt upon a mountain in Ethiopia, near the Nile, without the accommodation either of houſe or cell. They did not form themſelves into ſocieties like thoſe of India, but each had his private retirement, where he ſtudied and performed his devotions by himſelf. If any perſon had killed another by chance, he applied to theſe ſages for abſolution, and ſubmitted to whatever penances they enjoined. They obſerved an extraordinary frugality, and lived only upon the fruits of the earth. Lucan aſcribes to theſe gymnoſophiſts, ſeveral new diſcoveries in aſtronomy.

As to the indian gymnoſophiſts, they dwelt in the woods, where they lived upon the wild products of the earth, and never drank wine, nor married. Some of them practiſed phyſic, and travelled from one place to another: theſe were particularly famous for their remedies againſt barrenneſs. Some of them, likewiſe, pretended to practiſe magic, and to foretel future events.

In general, the gymnoſophiſts were wiſe and learned men: their maxims and diſcourſes, recorded by hiſtorians, do not in the leaſt ſavour of a barbarous education, but are plainly the reſult of great ſenſe, and deep thought. They kept up the dignity of their character to ſo high a degree, that it was never their cuſtom to wait upon any body, not even upon princes themſelves; for which reaſon Alexander, who would not condeſcend to viſit them in perſon, ſent ſome of his courtiers to them in order to ſatisfy his curioſity. Their way of educating their diſciples, is very remarkable. Every day, at dinner, they examined them how they had ſpent the morning; and every one was obliged to ſhew, that he had diſcharged ſome good office, practiſed ſome virtue, or improved in ſome part of learning: if nothing of this appeared, he was ſent back without his dinner. They held a tranſmigration of ſouls; and it is probable that Pythagoras borrowed his doctrine from them.

GYMNOSPERMIA, in botany, a ſeries or ſub-diviſion of the didynamia claſs of plants; comprehending all thoſe with labiated flowers, without any pericarpium or capſule ſurrounding their ſeeds, which are only lodged in the baſe of the cup; whence the name gymnoſpermia. See the article DIDYNAMIA.

GYMNOTUS, in ichthyology, a genus of malacopterygious fiſhes, without any back or belly-fins, and with only five bones in the membrane of the gills.

There is only one known ſpecies of this genus, the carapo of Marcgrave.

GYNÆCEUM, among the antients, the apartment of the women, a ſeparate room in the inner part of the houſe, where they employed themſelves in ſpinning, weaving, and needle-work.

GYNÆCOCRACY, *γυναικοκρατεια*, denotes the government of women, or a ſtate where women are capable of the ſupreme command. Such are Britain and Spain.

GYNANDRIA, in botany, the name of one of Linnæus's claſſes of plants, the twentieth in order; comprehending all the plants whoſe ſtamina are placed either on the ſtyle or on the receptacle, elongated into the form of a ſtyle, and carrying on it both the piſtil and ſtamina. See the article BOTANY.

Of the ſeveral genera of this claſs, ſome have two ſtamina to each flower; ſome, again, have three; and others, four, five, ſix, ten, or more. And hence they are naturally arranged into ſeveral diſtinct orders, under the appellations of gynandria-diandria, gynandria-triandria, *&c.*

GYNGLIMUS, or GINGLYMUS, in anatomy. See the article GINGLYMUS.

GYPSIES, or EGYPTIANS, are, in our ſtatutes, termed a counterfeit kind of rogues, who, diſguiſing themſelves both in their ſpeech and apparel, wander up and down the country, pretending to tell fortunes, cure diſeaſes, *&c.* under which pretence, they abuſe the ignorant, common people, by ſtealing and pilfering from them every thing that is portable, and which they may carry off undiſcovered. In order to ſuppreſs theſe impoſtors, ſeveral ſtatutes have been made; for by 28 H. 8. c. 10. Egyptians coming into England are to depart the realm in fifteen days, or may be impriſoned; and if they continue here above a month, ſhall be deemed guilty of felony. 5 Eliz. c. 20. Probably they might be ſo called from the antient Egyptians, who had the character of great cheats, whence the name might afterwards paſs proverbially into other languages, as it did into the Greek and Latin; or elſe the antient Egyptians being much verſed in aſtronomy, or rather aſtrology, the name was afterwards aſſumed by theſe modern fortune-tellers. Be that as it will, there is ſcarce any country in Europe without its gypſies. The Latins call them Egyptii; the Italians, Cingari and Cingani; the French, Bohemiens; others, Saracens, Tartars, &c. The firſt time we heard of them in England was in 1536.

GYPSOPHILA, in botany, a genus of the decandria-digynia claſs of plants, the corolla of which conſiſts of five oval, obtuſe, patent petals; the fruit is a globoſe capſule, compoſed of five valves, and containing only one cell, in which are many roundiſh ſeeds.

GYPSUM, or PLASTER-STONE, in natural hiſtory, a genus of foſſils naturally and eſſentially ſimple, not inflammable nor ſoluble in water, and compoſed of ſmall flat particles; which form bright, gloſſy, and in ſome degree tranſparent maſſes, not flexible or elaſtic, not giving fire with ſteel, nor fermenting with or being ſoluble in acid menſtrua, and very eaſily calcining in the fire.

Of theſe gypſums, ſome are harder, others ſofter; and are of ſeveral colours, as white, grey, red, green, &c. Sometimes diſtinct, and ſometimes variouſly blended together.

The texture of all the gypſums being ultimately the ſame, it may be ſufficient to obſerve, that their origin is plainly from particles of a determinate nature and ſubſtance, and of a certain and invariable figure, an oblong, flat, and irregularly angular one. Theſe we ſometimes ſee, as indeed is moſt natural to them, diſpoſed without order or regularity, into looſe, complex, friable maſſes; at others, they are getting out of their native order, and emulating the ſtructure of other claſſes of bodies, of which they are indeed properly the baſis, and appearing ſomewhat in the figure of the fibrariæ; and at other times, of the foliaceous compoſite flakes of the ſelenitæ: the ſpecies which have theſe ſtructures, are truly varying from the gypſums into thoſe bodies they emulate; for the fibrariæ are only a peculiar arrangement of theſe very particles, and the ſelenitæ only more broad flakes of the ſame, like thoſe of the foliaceous talcs.

The gypſums are much uſed in plaſter, for ſtuccoing rooms, and caſting buſts and ſtatues.

GYPSUM STRIATUM, *ſtriated plaſter ſtone*, the whitiſh, leſs gloſſy tricheria, with ſhort thick filaments. See TRICHERIA.

GYRFALCON, or GERFALCON. See the article GERFALCON.

GYRLE, or GIRLE, among ſportſmen. See the article GIRLE.

GYSHORN, a town of Germany, in the dutchy of Lunenburg, ſituated on the river Aller, forty-five miles north-eaſt of Hanover: eaſt longitude 10° 45′, north latitude 52° 50′.

H.

H, or h, the eighth letter, and ſixth conſonant in our alphabet; tho' ſome grammarians will have it to be only an aſpiration, or breathing. But nothing can be more ridiculous than to diſpute its being a diſtinct ſound, and formed in a particular manner by the organs of ſpeech, at leaſt in our language: witneſs the words *eat* and *heat*, *arm* and *harm*, *ear* and *hear*, *at* and *hat*, &c. as pronounced with or without the *h*.

It is pronounced by a ſtrong expiration of the breath between the lips, cloſing, as it were, by a gentle motion of the lower jaw to the upper, and the tongue nearly approaching the palate.

There ſeems to be no doubt, but that our *h*, which is the ſame with that of the Romans, derived its figure from that of the hebrew ה. And, indeed, the Phœnicians, moſt antient Greeks and Romans, uſed the ſame figure with our H, which in the ſeries of all theſe alphabets keeps its primitive place, being the eighth letter.

H, uſed as a numeral, denotes 200; and with a daſh over it, $\overline{H}$, 200,000.

As an abbreviation, H was uſed by the antients to denote *homo*, *hæres*, *hora*, &c.

Thus H. B. ſtood for hæres bonorum; and H. S. corruptly for L. L. S. a ſeſterce; and H. A. for Hadrianus.

HAAG, a town of Germany, and circle of Bavaria, thirty-two miles north-weſt of Munich.

HABAT, the north-weſt province of the empire of Morocco, ſituated on the ſtreights of Gibraltar.

HABBAKUK, or the prophecy of Habbakuk, a canonical book of the Old Teſtament.

There is no mention made in ſcripture, either of the time when this prophet lived, or of the parents from whom he was deſcended; but according to the authors of the lives of the prophets, he was of the tribe of Simeon, and a native of Bethzacar. As he foreſaw the taking of Jeruſalem by Nebuchadnezzar, he fled to Oſtracin in Arabia, where he lived for ſome time; but after the Chaldeans had made themſelves maſters of Jeruſalem, and were on their return home, he returned into Judæa, where he employed himſelf in agriculture; but as he was carrying the reapers their dinner, he is ſaid to have been tranſported by an angel to Babylon, with what he had provided for his people in the field; which he ſet before Daniel, who was ſhut up in the lion's den, and was tranſported back again to Judæa, where he died; before the end of the captivity.

He is reported to have been the author of ſeveral prophecies which are not extant: but thoſe that are indiſputably his, are contained in three chapters. In theſe the prophet complains very pathetically of the diſorders which he obſerved in the kingdom of Judæa. God reveals to him, that he would ſhortly puniſh them in a very terrible manner by the arms of the Chaldæans. He foretels the conqueſts of Nebuchadnezzar, his metamorphoſis, and death. He foretels, that the vaſt deſigns of Jehoiakim would be fruſtrated. He ſpeaks againſt a prince (probably the king of Tyre) who built with blood and iniquity; and he accuſes another king (perhaps the king of Egypt) of having intoxicated his friend, in order to diſcover his nakedneſs. The third chapter is a ſong or prayer to God, whoſe majeſty he deſcribes with the utmoſt grandeur and ſublimity of expreſſion.

HABDALA, a ceremony of the Jews, obſerved on the ſabbath in the evening, when every one of the family is come home. At that time, they light a taper, or lamp, with two wicks at leaſt: the maſter of the family then takes a cup with ſome wine, mixed with fragrant ſpices; and, after having repeated a paſſage or two of ſcripture, as, for example, "I will take the cup of ſalvation, *&c.*" Pſal. cxvi. and, "The Jews had light and gladneſs, *&c.*" Eſth. viii. he bleſſes the wine and ſpices. Afterwards he bleſſes the light of the fire, and then caſts his eye on his hands and nails, as remembring that he is going to work. The whole is intended to ſignify that the ſabbath is over, and is from that moment divided from the day of labour which follows. For this reaſon the ceremony is called habdala, which ſignifies diſtinction.

HABEAS CORPORA, in law, a writ iſſued for bringing in a jury, or ſuch of them as refuſe to appear upon the venire facias, for the trial of a cauſe brought to iſſue.

It commands the ſheriff to have the jurors before the judges on ſuch a day, *&c.* and is of the ſame nature in the common pleas, as the diſtringas juratores in the court of king's bench.

HABEAS CORPUS, in law, is a writ of two kinds, the one being the great writ of the engliſh liberty, which lies where a perſon is indicted for any crime or treſpaſs before juſtices of the peace, or in a court of any franchiſe, and on being impriſoned, has offered ſufficient bail, which has been refuſed, tho' the caſe be bailable; in which caſe he may have this writ out of the king's bench, in order to remove himſelf thither, to anſwer the cauſe at the bar of that court.

The practice in this caſe, is firſt to procure a certiorari out of the court of chancery, directed to all the juſtices for removing the indictment into the king's bench; and upon that to obtain this writ, directed to the ſheriff, for cauſing the body of the party to be brought at a certain day.

The other kind of habeas corpus is uſed for bringing the body of a perſon into court, who is committed to any gaol or priſon, either in criminal or civil cauſes; which writ will remove the perſon and cauſe from one court and priſon to another.

No habeas corpus, or other writ, to remove a cauſe from out of an inferior court, can be allowed, if the ſame be not delivered to the judge of the court, before the jury who are to try the cauſe have appeared, and before any of them are ſworn, 43 Eliz. c. 5.

The habeas corpus act, 31 Car. II. c. 2. has ordained, that a perſon may have a habeas corpus from any judge, on complaint made and view of the warrant of commitment, (except ſuch perſon is committed for treaſon or felony expreſſed in the warrant, or ſome other offence that is not bailable) which habeas corpus muſt be made returnable immediately; and on producing a certificate of the cauſe of commitment, the priſoner is to be diſcharged on bail given to appear in the court of king's bench the next term, or next aſſizes, *&c.* Perſons committed for either treaſon or felony, expreſsly mentioned in the warrant, upon a motion made in open court, in the firſt week of the term, or day of ſeſſions, *&c.* after commitment, are to be brought to trial; and if they are not indicted the next term or ſeſſions after commitment, on a motion made the laſt day of that term, they ſhall be let out upon bail, except it appear on oath that the king's witneſſes are not ready; and in caſe they are not indicted or tried the ſecond term after commitment, they ſhall be diſcharged.

Judges denying a habeas corpus, ſhall forfeit 500 l. and if an officer refuſe to obey it, or to deliver a true copy of the commitment-warrant, he forfeits 100 l. for the firſt offence.

Habeas corpus *ad proſequendum*, a writ for the removal of a perſon in order to proſecution and trial in the proper county.

Habeas corpus *ad faciendum et recipiendum*, a writ iſſued out of the court of common-pleas, on behalf of defendants ſued in inferior courts, to remove their cauſe into the ſaid court.

Habeas corpus *ad reſpondendum*, a writ that lies where a perſon is impriſoned at another's ſuit in any priſon except that of the king's bench; and a third perſon would ſue the priſoner there, in which caſe this writ will remove ſuch priſoner from the priſon where he is, into the king's bench, to anſwer the action in that court.

Habeas corpus *ad ſatisfaciendum*, a writ that lies againſt a perſon in the fleet-priſon, *&c.* to charge him in execution. The delivery of this writ to the warden, is ſufficient.

HABENDUM, in law, a term ſignifying to have and to hold.

A deed or conveyance has two principal parts; the premiſes and the habendum. The office of the firſt is to expreſs the names of the grantor, the grantee, and the things granted: that of the habendum, to ſhew what eſtate or intereſt the grantee is to have in what is granted. According to lord Coke, the habendum is to limit the eſtate, ſo that the general implication, which by conſtruction of law paſſes in the premiſes, is by the habendum controlled and qualified. Thus in a leaſe to two perſons, to have and to hold to the one for life, alters the implication of the joint tenancy in the freehold, which would paſs by the premiſes, were it not for the habendum.

HABERDASHER, in commerce, a ſeller of hats, or of ſmall wares.

The maſter and wardens of the company of haberdaſhers in London, calling to their aſſiſtance one of the company of cappers, and another of the hat-makers, and mayors, *&c.* of towns, may ſearch the wares of all hatters that work hats with foreign wool, and have not been apprentices to the trade, or who dye them with any thing but copperas and galls, or woad and madder; in which caſe they are liable to penalties, by ſtat. 8. Eliz. c. 7. and 5 Geo. II. c. 22.

HABERE facias *poſſeſſionem*, a writ that lies where one has recovered a term for years in an action of ejectment, in order to put him into poſſeſſion again.

The ſheriff is obliged to execute this writ, and may raiſe the poſſe comitatus to aſſiſt him, in caſe he be oppoſed. He may alſo break open a houſe into which entrance is denied, to deliver poſſeſſion to the perſon recovering by law. But an action of the caſe lies againſt him, if he deliver poſſeſſion of more than is contained in the writ.

Habere facias *ſeiſinam*, a writ which lies where a perſon has recovered land in the king's court; directed to the ſheriff, commanding him to give ſeiſin of the land recovered.

This writ ſometimes iſſues out of the records of a fine, and requires the ſheriff to give the cogniſee, or his heirs, ſeiſin of the land in which the fine is levied.

There is likewiſe a writ called, habere facias ſeiſinam, ubi rex habuit annum, diem & vaſtum, that lies for the delivery of lands to the lord of the fee, after the king has had his year, day and waſte, in the lands of one convicted of felony.

Habere facias *viſum*, is a writ that lies in divers caſes, as in dower, formedon, *&c.*

&c. where it is neceſſary to take a view of the lands or tenements in queſtion.

HABERGION, a ſmall coat of mail, or only ſleeves and gorget of mail, formed of little iron rings, or maſhes linked into each other. See the article GORGET.

HABILIMENTS *of war*, in our antient ſtatutes, ſignify armour, harneſs, utenſils, or other proviſions for war, without which there is ſuppoſed no ability to maintain war.

HABIT, in philoſophy, an aptitude or diſpoſition either of mind or body, acquired by a frequent repetition of the ſame act. This habit is by ſome of the ſchoolmen termed *habitus qualitativus*, a qualitative habit, and defined a quality adventitious to a thing, fitting and diſpoſing it either to act or ſuffer. Others again define habit an affection of the mind or body, perſiſting by long uſe and continuance. Hence habits may be diſtinguiſhed into thoſe of the mind and of the body: thus virtue is called an habit of the mind, ſtrength, an habit of the body. All natural habits, whether of body or mind, are no other than the body and mind themſelves conſidered as either acting or ſuffering; or they are modes of the body or mind wherein either perſeveres, till effaced by ſome contrary mode.

Cuſtom, ſays Mr. Locke, ſettles habits of thinking in the underſtanding, as well as of determining in the will, and of motions in the body, all which ſeem to be but trains of motion in the animal ſpirit, which once ſet a going, continue on in the ſame ſteps they have been uſed to, which by often treading are worn into a ſmooth path, and the motion in it becomes eaſy as well as natural. See ASSOCIATION.

The archbiſhop of Cambray defines habits in general to be the certain impreſſions left in the mind, by means whereof we find a greater eaſe, readineſs and inclination to do any thing formerly done, by having the idea ready at hand to direct us how it was done before. Thus, for example, we form the habit of ſobriety, by having always before us the inconveniencies of exceſs; the reflections whereof being often repeated, render the exerciſe of that virtue continually more and more eaſy.

Malebranche gives a more mechanical theory of habits. His principle is, that they conſiſt in a facility which the ſpirits acquire of paſſing eaſily from one part of the body into another. He argues thus: if the mind act on, and move the body, it is in all probability by means of a ſtock of animal ſpirits lodged in the brain, ready to be ſent at the motion of the will, by means of the nerves which open or terminate in the brain, into the muſcles of the body.

Now an influx of ſpirits into a muſcle occaſions a ſwelling, and of courſe a ſhortening of the muſcle, and conſequently a motion of that part to which the muſcle is faſtened. Further, the ſpirits do not always find all the roads open and free through which they are to paſs: whence that difficulty we perceive of moving the fingers with that quickneſs neceſſary to play on a muſical inſtrument, or of moving the muſcles neceſſary to pronounce the words of a foreign language But by degrees the ſpirits, by their continual flux, ſmooth the way ſo, that at length they meet with no reſiſtance at all. Now it is in this facility the ſpirits find of paſſing, when directed into the members of the body, that habits conſiſt.

HABIT, in medicine, denotes the ſettled conſtitution of the body, or the habitude of any thing elſe, as the ſtructure or compoſition of a body, or the parts thereof.

HABIT is alſo uſed for a dreſs or garb, or the compoſition of garments, wherewith a perſon is covered; in which ſenſe we ſay the habit of an eccleſiaſtic, of a religious, *&c.* a military habit, *&c.*

The different habits and cloths that the generality of the world wear, are, through inadvertency and inattention, very frequently the cauſe of very unhappy maladies. The antients have obſerved the inconveniencies of many parts of dreſs; and daily obſervations confirm to us the many miſchiefs the ladies ſuffer from the ſtiff whale-bone ſtays they wear, and the diſorders of the viſcera of the lower belly to which thoſe are ſubject who lace themſelves too tightly; and this is not only of dangerous conſequence to themſelves, but frequently is the death of children in breeding women. The tight binding of the neck by the mens neck-cloths, ſtocks, or the two tight collars of their ſhirts, *&c.* has been very frequently the occaſion of very terrible diſorders of the head, the eyes, and the breaſt; deafneſs, vertigoes, faintings, and bleedings at the noſe, are the frequent conſequences of this practice. Mr. Winſlow has obſerved, that the different motions of the bones of the foot, which are very free in their natural ſtate, as is very plainly ſeen in young children, are uſually wholly loſt to us as we grow up, by-means of the improper preſſure of our ſhoes. The high-heeled ſhoes the women wear, entirely changes the natural conformation of the bones of the whole foot.

Angelic **HABIT** or **GARMENT**, among our anceſtors, was a monkiſh garment, which laymen put on a little before their death, that they might have the benefit of the prayers of the monks. It was from them called angelic, becauſe they were called *angeli*, who, by theſe prayers, *animæ ſaluti ſuccurabant.*

HABITATION, or **COHABITATION**, in law. See the article COHABITATION.

HABITUAL, ſomething grown to a habit by long uſe. See the article HABIT.

HABITUAL GRACE, among divines. See the article GRACE.

HABITUDE, among ſchoolmen, the reſpect or relation one thing bears to another. See RELATION.

Some of the more preciſe ſchoolmen conſider habitude as a genus, and ſub-divide it into two ſpecies; where it is conſidered as quieſcent, they call it reſpect; where as moved, relation: to which ſome add a third ſpecies, conſidered in reſpect of figure, which they call mode.

HABITUDE is alſo uſed by philoſophers for what we commonly call habit, or a certain diſpoſition or habitude for the performing or ſuffering certain things, acquired by repeated acts of the ſame kind.

HACHA, a town of Terra firma, in South America, ſituated on the north ſea, at the mouth of the river Hacha, in weſt long. 72°, north lat. 11° 30′.

HACKNEY, a village on the north-eaſt ſide of London, with a handſome church, three meeting-houſes, and ſeventeen alms-houſes.

HACKNEY-COACH. See COACH.

HADDINGTON, a parliament-town of Scotland, about eighteen miles eaſt of Edinburgh.

HADDOCK, the engliſh name of a well known fiſh of the gadus-kind, with a bearded mouth, and three fins on the back: its body is whitiſh; the upper-jaw longeſt, and the tail a little forked. See the article GADUS.

HADE, among miners, ſignifies the ſteep deſcent of a ſhaft, or the like paſſage.

HADEMAR, a town of Germany, in the circle of the Upper Rhine, and county of Naſſau in the Wetteraw, ſituated in 7° 45′ eaſt longitude, and 50° 26′ north latitude.

HADERSLEBAN, a town of Sleſwick, or ſouth Jutland, ſituated near the ſea called the little Belt, in eaſt longitude 10°, north latitude 55° 15′.

HADLEY, a market-town of Suffolk, ſituated ſeventeen miles ſouth-eaſt of Bury.

HADRAMUT, a city of Arabia Fælix, the capital of the province of Hadramut, ſituated in eaſt longitude 50° 30′, north latitude 16°, three hundred and ſixty miles north-eaſt of Mocho.

HÆMACHATES, in natural hiſtory, the variegated, blood-coloured agat of the antients. See the article AGAT.

HÆMAGOGOS, among phyſicians, a compound medicine, conſiſting of fetid and aromatic ſimples, mixed with black hellebore; and preſcribed in order to promote the menſtrual and hæmorrhoidal fluxes, as alſo to bring away the lochia. See the article MENSES, *&c.*

HÆMANTHUS, GUINEA-ORCHIS, in botany, a genus of the hexandria-monogynia claſs of plants, the corolla whereof conſiſts of a ſingle petal, erect, and divided into ſix erect linear ſegments; the tube is very ſhort, and angular: the fruit a roundiſh berry, containing three cells; the ſeeds are ſingle and triquetrous; the involucrum has ſometimes ſix leaves.

The flowers ſtand at the top in a kind of little umbel, and are of a very beautifully ſtellated appearance.

HÆMATITES, BLOOD-STONE, in natural hiſtory, an extremely rich and fine iron-ore. See the article IRON.

It is very ponderous, and is either of a pale red, a deeper red, or a bluiſh colour; uſually of a very gloſſy ſurface; and when broken, of a fine and regularly ſtriated texture; the ſtriæ converging toward the center of the body; and the maſſes thereof naturally breaking into fragments of a broad baſe and pointed end; appearing ſomething pyramidal. The hæmatites is various in its degrees of purity and hardneſs, as well as in its figure: the fineſt and moſt pure is of a botryoide ſurface; the whole ſuperficies riſing into larger or ſmaller roundiſh tubercles: ſometimes the hæmatites is of a coarſe texture, and a laxer ſtructure, in which ſtate it is known to many by the name ſchiſtus.

The hæmatites, beſides its value as an ore, has its uſes in medicine: the higheſt coloured and moſt like cinnabar that can be had, being eſteemed aſtringent and deſiccative. It is given in powder from ten grains to five and twenty for a doſe, in hæmorrhages; and is alſo uſed in diſtemperatures of the eyes.

HÆMATOPUS, the SEA-PYE, in ornithology, a diſtinct genus of birds of the order of the ſcolopaces, with a compreſſed beak, terminating in a wedge-like point. The hæmatopus is of the bigneſs of the common magpye, and is ſo called from the colour of its legs, which are of a bright ſcarlet.

HÆMATOSIS, among phyſicians, the ſame with ſanguinification. See the article SANGUINIFICATION.

HÆMATOXYLUM, CAMPEACHY-WOOD, in botany, a genus of the decandria-monogynia claſs of plants, the flower of which conſiſts of five equal and ovated petals; the fruit is a lanceolated, obtuſe and unilocular, bivalve capſule, containing a few compreſſed, oblong ſeeds. See the article CAMPEACHY.

HÆMOPTOSIS, HÆMAPTYSIS, or HÆMOPTOE, in medicine, a ſpitting of blood.

An hæmaptyſis is either accidental or habitual, and is ſtopped by aſtringents, as bole-armenic, dragon's blood, and the lapis hæmatites, and beſt and moſt ſafely cured by the peruvian bark. In this diſorder purging is to be avoided, but bleeding is convenient; diuretics and diaphoretics are of uſe, but opiates are excellent; in particular ſemen hyoſciami is a noble ſpecific, commended both by the antients and moderns, yet it is to be given with great precaution, in ſmall quantities, and often repeated; for when given in too large a doſe, it occaſions a delirium: hedera terreſtris, or ground-ivy, produces marvelous effects.

In a deſperate accidental hæmaptyſis, other things being tried in vain, (as in all other hæmorrhages) the expectation of the phyſician is ſeldom fruſtrated, if he makes uſe of the following remedy. Take plantain water and red wine, of each half a pound; ſyrup of poppies, half an ounce; to theſe add a very ſmall quantity of the oil of vitriol, and make the whole up into a julep.

In caſes of extremity, the fumes of quick lime and vinegar, are ſaid to be very good.

HÆMORRHAGE, in medicine, a flux of blood from any part of the body.

Hæmorrhages are divided by medical writers into natural and preternatural.

Natural hæmorrhages comprehend bleeding at the noſe, ſpitting of blood, the fluxes of the hæmorrhoids and menſes, the lochia in lying-in women, vomiting of blood, and voiding of blood by urine.

The preternatural hæmorrhages are ſuch as derive their origin from external accidents, as falls, blows, and wounds: ſome alſo comprehend under this term the artificial evacuations by bleeding, cupping, and the like.

Hæmorrhages differ much according to the age and ſtate of the patient, and other accidents: hæmorrhages from the noſe, are moſt frequent in young perſons; thoſe of the hæmorrhoides, in perſons of a middle age, or later in life; the ſpitting of blood, to perſons in a middle age; and voiding of blood by urine, uſually to older people.

Some hæmorrhages are periodical, and others vague or uncertain. The firſt obſerve ſome ſtated periods of time for their return upon people: the laſt are wholly uncertain in that particular. Some are alſo termed critical; theſe are ſuch as happen in the criſis of fevers. There are uſually violent pains about thoſe parts whence natural hæmorrhages are to proceed; but theſe always go off as ſoon as the bleeding comes on in due quantity. Young perſons of a healthy and florid conſtitution, are moſt ſubject to hæmorrhages: people of plethoric habits, are alſo much ſubject to them; and eſpecially ſuch whoſe blood is ſound and fluxile, not ſubject to any dyſcracy; thoſe who drink much wine, or eat high ſeaſoned food; and chiefly thoſe perſons who are ſubject to violent paſſions, eſpecially anger: hence it is that brutes are rarely afflicted with them. The principal cauſes therefore of hæmorrhages are plethora, violent commotions of the body, hot foods and liquors, a heat of the ſeaſon, a ſudden cooling of the body after violent heat, and paſſion.

As to the prognoſtics of hæmorrhages, it may in general be obſerved, that thoſe proceeding from the lungs, vomiting, and voiding blood by urine, are all very dangerous. The others, when regulated, and in due proportion, are ſalutary, and often prevent diſeaſes. But the common cuſtom of ſtopping them by aſtringents, or otherwiſe, is often productive of ſtagnations, inflammations, and violent fevers.

Natural hæmorrhages are more particularly,

HÆMORRHAGE, or BLEEDING *at the noſe*, is owing to the more plentiful appulſe of blood to the noſtrils, by a ſtronger motion of the heart, whereby the ſmall arteries in the pituitary coat become turgid, and too much diſtended, till at length they gape, and the blood guſhes out. A bleeding at the noſe may be promoted when perſons of ſedentary lives, that indulge their appetites, and ſo become plethoric, put their blood into extraordinary agitation, by any of the cauſes already mentioned, or by volatile medicines, hot baths, or ſuddenly chilling their feet, *&c.* This hæmorrhage differs much as to the quantity, ſome loſe only a few drops, ſome ſeveral ounces, and ſome five or ſix pounds. No hæmorrhage is more apt to return; which it does to ſome in a few days, to others in a few hours. To the plethoric it is generally ſalutary; and there are many inſtances of a vertigo, ſcotomia, dull, heavy pains of the head, a phrenſy, and even an epilepſy, being carried off by it. On the contrary, from its ſuppreſſion there have ariſen vertigoes, apolexies, epilepſies, convulſions, noiſe in the ears, hardneſs of hearing, and even a gutta ſerena.

But enormous and long continued bleedings at the noſe, when they ariſe from ſpaſms of the internal parts, and are preceded with coldneſs of the extreme parts, and fainting fits, generally occaſion death: it is alſo dangerous in ſpotted and malignant fevers, and in chronical diſeaſes. If the bleeding is very inordinate, it will be proper to uſe cooling emulſions, gentle or ſtronger opiates, to moderate the ſpaſtic ſtrictures, as occaſion ſhall require. Camphor mixed with nitre and calx of antimony, will be highly neceſſary, if the matter of exanthemata or cutaneous eruptions is the cauſe of the hæmorrhage, as is often the caſe. A revulſion may be made from the head by bleeding in the lower parts; then by temperate pediluvia, and putting the hands into warm water. After a revulſion by bleeding, there is nothing equal to nitre, to appeaſe the orgaſm of the blood; next to theſe are vegetable acids, ſuch as the juice of ſeville-oranges, barberries, the water and juice of wood ſorrel; but more eſpecially the diluted ſpirit of vitriol, tincture of roſes, *&c.*

Externally refrigerants may be mixed with diſcutients, and applied to the forehead, noſe, and neck. In perſons of a bilious conſtitution, cold water alone drank freely, has a good effect.

HÆMORRHAGE *of the hæmorrhoids*, or *of the piles*. See HÆMORRHOIDS.

HÆMORRHAGE *of the lochia*, in lying-in women. See the articles LOCHIA and DELIVERY.

HÆMORRHAGE *of the menſes*. See the article MENSES.

HÆMORRHAGE *of the lungs*. See the articles BLOOD and HÆMOPTOSIS.

HÆMORRHAGE *of the urinary paſſages*, a diſorder commonly called piſſing of blood; being an emiſſion of blood, with or without urine, from the veſſels of the kidneys or bladder; which may be either enlarged, broken, or eroded; and is more or leſs dangerous, according to the different circumſtances that attend it. If pure blood is voided ſuddenly, without interruption, and without pain, we conclude, ſays Hoffman, it proceeds from the kidneys. It likewiſe comes from the kidneys if the urine is coffee-coloured, or more florid, and generally precedes a fit of the gravel: it ſometimes accompanies the paſſage of a ſtone through the ureter: but if the blood is of a dark colour, with or without purulent matter, emitted with heat and pain in the pubes, and in a ſmall quantity, it certainly proceeds from the bladder. It may be occaſioned by a ſtoppage of the hæmorrhoidal flux; from a violent motion of the body, eſpecially riding; from a ſtone concealed in the kidney; from an eroſion and ulcers of the bladder; from external violence; from griping pains cauſed by violent purges; from ſharp diuretics, eſpecially cantharides.

All bloody urine has ſome degree of danger, but it is moſt ſo when mixed with purulent matter.

If the patient is plethoric, or it proceeds from a ſanguineous evacuation, bleeding is neceſſary, as alſo cooling nitrous draughts, and purified nitre mixed with abſorbents, with whey for a vehicle, or barley-broth, or ſmall-beer acidulated with drops of the ſpirit of vitriol. The body muſt be kept open with laxatives, as rhubarb, with currants; or with cream of tartar; alſo emollient clyſters. The relaxed veſſels muſt be agglutinated with decoctions of vulnerary herbs, ſuch as agrimony, ground-ivy, yarrow, goldenrod, and the roots of comfry dulcified with virgin-honey, to which milk may be occaſionally added.

If there is an ulcer in the kidneys or bladder, medicines muſt be given that ſheath the acrimony, ſuch as ſyrup of marſh-mallows, alſo infuſions of the vulnerary herbs above-mentioned, likewiſe of the barks of acacia, cherry-tree, and gum.

When grumous blood plugs up the paſſage of the ureter into the bladder, or the ſphincter of the bladder, and occaſions a difficulty or ſtoppage of urine, warm water drank plentifully, and baths of the ſame, are uſeful: likewiſe warm water ſhould be injected into the bladder with a ſyringe, that the ſharp humour may be diluted, and the grumes diſſolved: but if the urine ſhould be quite ſtopped with a ſpaſm, then give emulſions of the four cold ſeeds, with crabs eyes, and calx of antimony. Externally apply a bladder filled with a decoction of emollient flowers in milk to the abdomen, and keep the body open with manna, or an emollient oily clyſter. Milk and whey are likewiſe excellent in theſe diſorders, if a dram of bole armenic is taken in every draught.

It is an error of fatal conſequence to give aſtringents in theſe diſorders, which ſtop the flux too ſuddenly.

For ſuch preternatural hæmorrhages as derive their origin from external accidents, as falls, blows, and wounds, ſee the articles CONTUSION, WOUND, FISSURE, CONTRAFISSURE, &c.

For artificial hæmorrhages by bleeding, cupping, and the like, ſee the articles PHLEBOTOMY, CUPPING, &c.

For the critical hæmorrhages in fevers, &c. See the article FEVER, &c.

HÆMORRHOIDAL, an appellation given by anatomiſts to the arteries and veins going to the inteſtinum rectum. The internal hæmorrhoidal artery is a branch of the inferior meſenteric; and the external one, a branch of the iliac. The hæmorrhoidal veins are branches of the hypogaſtrics.

HÆMORRHOIDS, or PILES, in medicine, an hæmorrhage, or flux of blood from the hæmorrhoidal veſſels. See HÆMORRHAGE, and HÆMORRHOIDAL.

When the hæmorrhoidal veſſels only ſwell, and diſcharge no blood, but are exceeding painful, this is termed the blind piles.

All copious fluxes of the blood from the anus, are not to be reckoned of the morbous kind. For the habit of body, ſtrength, age, and temperament, of the patient are to be conſidered. That which is enormous and exceſſive to one perſon, may be moderate and ſalutary to another. That only is to be eſteemed pernicious, which continues too long, and enfeebles the patient, whereby the digeſtion, nutrition, and other functions are hurt, and there is reaſon to fear the production of dangerous chronical diſeaſes. An extenſive hæmorrhoidal flux is generally preceded by a heavy preſſing pain of the back and loins: ſometimes a numbneſs of the legs and thighs; a conſtriction of the external parts, with a ſlight ſhivering, and a ſubſidence of the veſſels therein; a hard contracted pulſe; a dryneſs of the mouth and fauces; the urine diminiſhed in quantity, and moſt commonly pale; a ſenſe of weight about the anus extending to the perinæum; a weakneſs of the ſtomach; a flatulency in the lower belly; a frequent deſire to make water, and to go to ſtool; with ſometimes an excluſion of a white bilious mucus; the old and weak have a *procidentia ani*.

In this caſe the blood is generally at firſt black, and very grumous, and ſometimes comes away in large clots from the varicous veſſels; afterwards it becomes red, and at laſt ſerous: ſometimes it is pituitous, or like the white of an egg. There are inſtances of voiding a pint or a quart of blood daily. It often continues long, from twenty to thirty, or even forty days.

The external or blind piles ſeldom bleed, but turn to painful varices, which being opened, weep a little, but will not yield much blood. But the internal piles, which are the off-ſpring of the ſplenic branch, and are extended to the inner ſubſtance of the rectum, and as far as the ſphincter of the anus, together with the ſmall arteries derived from the lower meſeraic, not only bleed plentifully, but when the flux is ſuppreſſed, create diſeaſes of the liver, ſpleen, pancreas, meſentery and inteſtines.

The perſons ſubject to this diſeaſe, are thoſe of a looſe, ſpungy texture, of a bulky ſize, who live high, and lead a ſedentary life, or to whom it is hereditary: ſharp purges, aloetics, high-ſeaſoned food, free drinking of ſweet wines, neglect of cuſtomary bleeding, anger, ſadneſs, hard riding, and the like, will uſher in this diſorder.

This hæmorrhage is dangerous, becauſe it decays the ſtrength, waſtes the body, and produces a ſenſe of weight in the thighs. The ſleep is laborious, and the precordia oppreſſed, there is a rumbling in the belly, and a weak pulſe. When it continues long, the ancles ſwell, and the countenance is ghaſtly. There is a ſtraitneſs of breathing; and laſt of all, it terminates in a cachexy, dropſy, or a ſlow and hectic fever.

If the patient is plethoric, bleed, and let his drink be cold water of the chalybeate kind; or whey turned with orange juice, or juleps, made with tincture of roſes, cooling waters, and ſyrup of roſes; likewiſe nitre, in powder, with abſorbents; and to appeaſe the ſpaſm, opiates of the mildeſt kind.

If it continues long, and the blood begins to grow ſerous, then give rhubarb with currants, and tamarinds, or which is much the ſame, with cream of tartar. Then gentle diaphoretics may be compounded of burnt hartſhorn, calx of antimony, wine-vinegar, mixt with crabs-eyes, water of elder flowers, ſimple alexitereal water, and diaſcordium, or hot decoctions of yarrow, veronica, *&c.* may be taken in bed in order to ſweat; alſo half a grain of camphor mixt with nitrous and bezoardic powders. The camphor may ſeem an inconſiderable doſe, yet its efficacy is very great in diſorders of this kind.

In the blind piles there is a moſt intenſe pain at the time of going to ſtool, and the excrements are tinged with blood: ſometimes tumours like warts lie hid under the ſphincter, or appear on the verge of the anus. Sydenham orders to take away ten ounces of blood from the arm; then to diſſolve two drams of litharge, in four ounces of ſpring water, with which mix one ſcruple of thebaic extract. Dip a hot cloth in a little of this mixture, and apply it to the part; or if the tumour is within, inject a few ſpoonfuls of it with a ſyringe; the patient muſt abſtain from fleſh, drink barley water, and take diacodium every night.

Sometimes the veins in the blind piles are ſo much dilated with blood, as to be very painful, and raiſe tubercles as large as peaſe, grapes, or eggs: they appear livid and black from the ſtagnation of a thick blood, and when preſſed with the fingers, feel like a bladder filled with liquor. Some are ſoft and indolent, others hard, inflamed, and painful, rendering the patient unable to walk, ſit, or ſtand, and produce ſuch a ſpaſm in the anus, as not to admit a clyſter: ſometimes they bleed, or turn to troubleſome itching ulcers, and occaſion an abſceſs, or a fiſtula.

According to Heiſter, linen dipt in warm ſpirit of wine, and emollients, are of infinite ſervice. Leeches may be alſo applied to exhauſt the blood; if they are not at hand, and the parts are inflamed, the lancet muſt be uſed; then dreſſings muſt be made with lint, with compreſſes, and the T bandage. The tubercles, which are full and large, may be removed by a ligature, unleſs inflamed. Sometimes they are high in the rectum, and then a ſpeculum ani muſt be uſed, in which caſe they muſt be either ſcarified with a lancet, or divided with ſciſſars, that the thick noxious blood may be diſcharged, and the pains relieved.

HÆMORRHUS, the BLOOD-SNAKE, the name of a peculiar ſpecies of ſerpent; ſo called, becauſe it was ſuppoſed, that, on a perſon's being bit by it, the blood flowed out of every part of the body. It is a ſmall ſerpent, ſeldom arriving to more than a foot long; its eyes are remarkably vivid, bright, and ſparkling; its ſkin is very gloſſy, and its back variegated with a great number of black and white ſpots; its neck is very ſlender; its tail extremely ſharp; and it has a ſort of ſmall horn placed over its eyes: it is found in Egypt. There is alſo an american kind of this ſerpent found in the ſouthern parts of that continent, and called by the natives ahucyatli, which is larger than the other, and reſembles the rattle-ſnake in many particulars, but wants the diſtinguiſhing character of the rattle in the tail. See the articles SERPENT and RATTLE-SNAKE.

HÆMUS, now called RHODOPE, a mountain that divides Bulgaria from Thrace, or Romania, in European Turky.

HÆREDE ABDUCTO, an antient writ that lay for the lord, who having the wardſhip of his tenant while under age, could not come by his body, it being carried away by another perſon.

HÆREDE DELIBERANDO, *&c.* a writ directed to the ſheriff, to require one who had the ward of another, to deliver him to the perſon whoſe ward he was, on account of his land.

HÆREDE RAPTO, or raviſhment de gard. See the article RAVISHMENT.

HÆRESY, the crime of heretics. See the article HERETIC.

HÆRETICO COMBURENDO, a writ which formerly lay againſt one convicted of hereſy by his biſhop, and having abjured, afterwards fell into it again, or at leaſt into ſome other, upon which he was committed into the hands of the ſecular power; and by virtue of this writ, upon a certificate of his conviction, he was burnt.

This writ was taken away by ſtatute 29 Car. II. c. 9.

HAERLEM, a populous city of the United Provinces, in the province of Holland, ſituated near the lake which from this town is called Haerlem-Meer; four miles eaſt of the ocean, and twelve weſt of Amſterdam: eaſt long. 4° 20′, north lat. 52° 30′.

HAGAI, a canonical book of the Old Teſtament, ſo called from the prophet of that name, who, in all probability was born at Babylon, from whence he returned with Zerubbabel.

This prophet, by the command of God, exhorted the Jews, after their return from the captivity, to finiſh the rebuilding of the temple, which they had intermitted for fourteen years. His remonſtrances had the deſired effect; and to encourage them to proceed in the work, he aſſured them from God, that the glory of this latter houſe, ſhould be greater than the glory of the former: which was accordingly fulfilled, when Chriſt honoured it with his preſence; for, with reſpect to the building, this latter temple was nothing in compariſon of the former.

HAG BOAT, a kind of ſhip. See SHIP.

HAGIASMA, or AGIASMA, among antient writers, is ſometimes uſed for the whole church, and ſometimes for the more ſacred part thereof.

HAGENAU, a fortified town of Germany, in the landgraviate of Alſace: eaſt long. 7° 40′, north lat. 48° 45′.

HAGGARD FALCON, the greeniſh legged falcon, with a livid back. It is a large ſpecies, equal to a full grown hen in ſize. See the article FALCON.

HAGIAZ, a province of Arabia, whereof Mecca is the capital.

HAGIOGRAPHA, or holy writings, a name given to a particular diviſion of the Old Teſtament, as containing hymns to God, and moral precepts for the conduct of life. The books diſtinguiſhed by this term were the Pſalms, Proverbs, Eccleſiaſtes, and the Song of Solomon.

HAGIOSIDERON, in the greek church, a name given to an inſtrument made of iron, uſed by the Greeks, under the dominion of the Turks, to ſupply the place of bells, the uſe of which is prohibited. It is a plate of iron about three inches broad, and ſixteen long, faſtened by the middle to a chain or cord, and hung at the church door; on this they ſtrike with an iron-hammer, with a kind of meaſure or cadence that is not diſagreeable.

This is uſed to call the people to church; and it is alſo carried before the prieſt, in a proceſſion of the ſacrament to a ſick perſon, when it is beat upon from time to time, to advertiſe the people to adore it, juſt as the romiſh church do with a bell.

HAGUE, a town of the United Provinces, in the province of Holland, ſituated two miles eaſt of the ſea, and fourteen north-weſt of Rotterdam. This is one of the fineſt towns in Europe; but tho' it enjoys all the privileges of a city of Holland, except that of ſending repreſentatives to the ſtates, yet as it has no walls, it is only eſteemed a village. Here every city of the United Provinces has a houſe for their reſpective deputies, and here the ſtates of the province of Holland aſſemble, and all public affairs are tranſacted.

HAIL, *grando*, in phyſiology, an aqueous concretion, in form of white or pellucid ſpherules, deſcending out of the atmoſphere.

Hail is evidently no other than drops of rain congealed into ice. This happens when in their paſſage thro' the inferior air, they meet with nitrous particles, which are known to contribute greatly to freezing. Their magnitude is owing to a freſh acceſſion of matter as they paſs along. Hence we ſee the reaſon why hail is ſo frequent in ſummer, becauſe at that time greater quantities of nitre are exhaled from the earth, and float up and down the air. See the articles RAIN and FROST.

HAILBRON, a city of Germany, in the circle of Swabia, and dutchy of Wirtemberg: eaſt long. 9° north lat. 49° 10′.

HAINAN, or AYNAN, an iſland of an oval form, and about 300 miles in circumference, about fifty miles ſouth of the continent of China, and ſubject to that emperor. It is ſituated between 107 and 110° of eaſt long. and between 18 and 20° of north latitude.

HAINAULT. See HAYNAULT.

HAINBURG, a town of Germany, in the circle and archdutchy of Auſtria, ſituated on the Danube, thirty-five miles eaſt of Vienna: eaſt long. 17° 8′ north lat. 48° 20′.

HAINES, a river of the Auſtrian Netherlands, which runs from eaſt to weſt thro' the province of Hainault, and falls into the Scheld at Conde.

HAIR, in phyſiology, ſlender, oblong, and flexible filaments, growing out of the pores of animals, and ſerving moſt of them as a covering.

When theſe filaments, in human ſubjects, grow on the body, they are denominated pili; when on the head, capilli. Theſe laſt are moſt proper for examination: that part of them, which is without the ſkin, appears cylindric to the naked eye; but, when examined by the help of glaſſes, it is found to be unequal and irregular, and often knotty. It is pellucid, but is not hollow; but the extremities of them are often ſplit into ſeveral parts, ſo as to reſemble a pencil. The part of the hair that is within the ſkin, is called the root of it; and, from its roundiſh figure, the bulb. This part is hollow and vaſculous, in the manner of the baſes of the young feathers on birds: this vaſculous part is incloſed in a follicle, or caſe, and is moſt conveniently to be examined in the large hairs of a cat's whiſkers, or in the beards of other animals.

The origin of the hair is in the cutis, and in the fat that lies underneath it; and probably from nerves, as an acute pain is felt in pulling them off. The nutritious matter of the hair is probably the ſame with that of the other parts of the body; not merely excrementitious, as the old authors have ſuppoſed. It is a common aſſertion, that the hair grows after a perſon is dead; but unqueſtionable experiments prove this to be of the number of vulgar errors, not at all the more true for being univerſally received as truth.

The colour of the hair is very different in different people of the ſame country; but there are alſo general differences of it, peculiar in a manner, to the climates. In the hotteſt countries it is very black; in the colder, it is yellowiſh, rediſh, or brown; but in all places it grows grey or white with age; and in the labourers in copper mines, and others, who are continually receiving the effluvia of that metal it becomes greeniſh. The length of the hair is, in the individual, very different. It is always much longer on the head than elſewhere. In general it is ſhort and curled under the torrid zone, and gradually longer in the more temperate climates. Its conſiſtence to the touch, alſo, varies greatly, 1. In regard to the different climates and ſubjects. In general, it is harſher in the Æthiopian than in the European; and harder and dryer in adults than in infants, whoſe habit abounds more with humidities. 2. In regard to the parts of the body on which it grows: it is very harſh and hard under the arm-pits, and about the pudenda: on the head it is much ſofter; and on all the other parts of the body it is greatly ſofter than there, and very ſhort.

As to the time of the origination of the hair, that of ſome parts of the body is of the ſame date with the parts it grows on; ſuch is that of the head, the eye-laſhes, and eye-brows. That of others begins to grow only at a certain time; ſuch is that of the beard, of the arm-pits, and of the pudenda: and in the ſame manner ſome of the hair continues always increaſing in length, while other parts of it never grow after the birth of the infant.

The uſe of the hair of the head is to keep that part warm, as well as to be an ornament to it: that of the reſt of the hair, except only that of the eye-brows and eye-laſhes, is not ſo eaſily determined.

Human-HAIR, in commerce, makes a conſiderable article of trade, the goodneſs of which conſiſts in its being neither too coarſe, nor too ſlender.

Hair that does not curl or buckle naturally, is made to do ſo by firſt boiling, and then baking it. Having ſorted it, they next roll it carefully upon pipes, hollowed in the middle; theſe they put into a pot or cauldron, and let them boil about two hours; then taking them out, they are dried and coverd with papers; and, laſtly, ſent to the paſtry-cook, who bakes them in an oven, till the cruſt with which they are covered is about three fourths baked.

The hair of ſeveral other animals, as the beaver, hare, coney, *&c.* is alſo uſed in commerce, and eſpecially in the manufacture of hats. See the article HAT.

As to the duties upon hair, that of camels pays, upon importation 6$\frac{93}{100}$d. each pound; and draws back, upon exportation, $6\frac{72\frac{1}{2}}{100}$d. Cow or ox-hair, pays 7 s. $2\frac{17\frac{1}{2}}{100}$d. the 112 pounds; and draws back, upon exportation, 6 s. $5\frac{62\frac{1}{2}}{100}$d. Elks-hair for ſaddles, the hundred weight, pays 2 s. $4\frac{87\frac{1}{2}}{100}$d. and draws back, upon exportation, 2 s. $1\frac{31\frac{1}{4}}{100}$d. Ordinary goats-hair pays $4\frac{57}{100}$d. the pound; and draws back, upon exportation, $4\frac{23\frac{3}{4}}{100}$d. Goats-hair, otherwiſe called carmenia-wool, pays $6\frac{44\frac{1}{2}}{100}$d. the pound; and draws back, upon exportation, $6\frac{11\frac{1}{4}}{100}$d. Horſe-hair pays $7\frac{18\frac{1}{8}}{100}$d. the pound; and draws back, upon exportation, $6\frac{46\frac{7}{8}}{100}$d. Human hair for perukes, pays 1 s. $7\frac{15}{100}$d. the pound; and draws back, upon exportation, 1 s. $5\frac{25}{100}$d.

HAIR, among farriers, is generally called the coat; and, with regard to horſes, deſerves particular conſideration.

The hair growing on the fetlock, ſerves as a defence to the prominent part of it, in travelling in ſtony ways, or in froſty weather: if the hair of a horſe's neck, and the parts moſt uncovered, be cloſe, ſmooth and ſleek, it is an indication of his being in health and good caſe. In order to make the hair of an horſe ſoft and ſleek, he muſt be kept warm at heart, for the leaſt inward cold will cauſe the hair to ſtare; alſo ſweat him often, for that will looſen, and raiſe the duſt and filth that renders his coat foul; and when he is in the heat of a ſweat, ſcrape off all the white foam, ſweat and filth that is raiſed up, with an old ſword blade; and alſo when he is blooded, if you rub him all over with his own blood, repeating it two or three days, and curry and dreſs him well, it will make his coat ſhine as covered with a fine varniſh.

Hair falling from the main or tail, is cauſed either by his having taken ſome heat, which has engendered a dry mange; or from ſome ſurfeit which cauſes the evil humours to reſort to thoſe parts. To cure this, anoint the horſe's mane and creſt with back ſoap; make a ſtrong lee of aſhes, and waſh it all over with it. But if a canker ſhould grow on a horſe's tail, which will eat away both fleſh and bone; then put ſome oil of vitriol to it, and it will conſume it: and if you find that the vitriol corrodes too much, you need only to wet it with cold water, and it will put a ſtop to it.

If you would take away hair from any part of a horſe's body; boil half a pound of lime in a quart of water, till a fourth part is conſumed, to which add an ounce of orpiment; make this into a plaſter, and lay it on.

HAIR'SBREADTH, a meaſure of length, being the forty-eighth part of an inch.

HAKE, in ichthyology, the engliſh name of the gadus, with two fins on the back, and the under jaw longeſt. It grows to two feet or more in length, but is the ſlendereſt of all the gadi. See GADUS.

HALABAS, a city of the hither India, and capital of the province of Halabas, ſituated at the conflux of the rivers Ganges and Jemma: eaſt long. 83° north at 26° 35′.

HALBARD, or **HALBERT**, in the art of war, a well-known weapon, carried by the ſerjeants of foot and dragoons.

It is a ſort of ſpear, the ſhaft of which is about five feet long, and made of aſh, or other wood. Its head is armed with a ſteel point, edged on both ſides, not unlike the point of a two-edged ſword. But beſides this ſharp point, which is in a line with the ſhaft, there is a croſs piece of ſteel, flat and pointed at both ends; but generally with a cutting edge at one extremity, and a bent ſharp point at the other; ſo that it ſerves equally to cut down, or puſh withal. It is alſo uſeful in determining the ground betwixt the ranks, and in adjuſting the files of a battalion.

HALBERSTAT, a city of Germany, in the circle of Upper Saxony, the capital of the dutchy of the ſame name; ſubject to the king of Pruſſia, eaſt long. 11° 6′, north lat. 51° 55′.

HALBERT, among farriers, is a ſmall piece of iron an inch broad, and three or four inches long, ſoldered to the toe of a horſe's ſhoe, to hinder a lame horſe from trading on his toe.

Theſe halbert ſhoes neceſſarily conſtrain a lame horſe, when he goes at a moderate pace, to tread or reſt on his heel, which lengthens and draws out the back ſinew, that was before in ſome meaſure ſhrunk.

HALCRYPTIUM, a name given by Dr.

Hill, to the ſalt ſuſpended in a fluid form, and in very ſmall quantities in mineral waters, ſcarce diſcernible by the taſte, and with much difficulty ſeparable from them; but, by proper management, may be procured in form of a dry powder; which, being carefully prepared by ſolution and evaporation, affords extremely minute, oblong, quadrangular cryſtals. The halcryptium, thus obtained, has all the properties of the common alkaline ſalts. See the article ALKALI.

All the chalybeate waters afford it; but none in ſuch large quantities as that of Pyrmont. See the article PYRMONT.

HALCYON, in ornithology, a name given by the antients to the iſpida, or king-fiſher. See the article KING-FISHER.

HALCYON DAYS, *dies halcyonii*, in antiquity, a name given to ſeven days before and as many after the winter-ſolſtice; by reaſon the halcyon, invited by the calmneſs of the weather, laid its eggs in neſts built on the rocks, cloſe by the brink of the ſea, at this ſeaſon.

HALE, in the ſea-language, ſignifies pull; as to hale up is to pull up; to hale in or out, is to pull in or out. To over-hale a rope, is to hale it too ſtiff, or to hale it the contrary way.

HALEM, a town of the Auſtrian Netherlands, in the province of Brabant, twenty-five miles weſt of Maeſtricht: eaſt long. 5° 5′, north lat. 51° 5′.

HALESWORTH, a market-town of Suffolk, thirty-five miles eaſt of Bury: eaſt long. 1° 40′, north lat. 52° 30′.

HALF-BLOOD, in law, is where a man marries a ſecond wife, the firſt being dead, and by the firſt venter has a ſon, and by his ſecond venter has likewiſe a ſon, the two brothers in this caſe are but of half-blood; they being iſſue by different venters; and on that account, lands in fee cannot deſcend from the one to the other; except in caſe of crown-lands, dignities, or eſtates tail. But half-blood is no impediment to an adminiſtration, which may be granted to that as well as to the whole blood, of the effects of an inteſtate; and the half-blood ſhall come in for a ſhare of his perſonal eſtate, equally with the whole blood, as the brothers by different venters are next of kin in equal degree. 22 Car. II. c. 10.

HALF-MARK, a noble or 6 s. 8 d.

HALF-MOON, in fortification, an out-work compoſed of two faces, forming a ſaliant angle, whoſe gorge is in form of a creſcent, or half-moon; whence the name. We owe the invention of half-moons to the Dutch, who placed them before the points of baſtions, which are now much better defended by counter guards; the half-moons being placed before the curtins, which they defend to admiration. There are two ſorts of half-moons, one with, and the other without flanks. Thoſe without flanks, which are moſt common, may be thus conſtructed: From F, (plate CXXV. fig. 1.) the angle of the flank, deſcribe an arch, M A, with the radius F M, four or five toiſes longer than the part of the line of defence E F. The point A, where this arch interſects the line C A, which divides the curtin in two equal parts, ſhall be the flanked angle of the half-moon; then the points, *b*, *b*, where the line of the counterſcarpe interſects the line A M, will determine the length of its faces, A *b*, A *b*. Thoſe with flanks are conſtructed much in the ſame manner; only that D *b*, from four to ten toiſes, is cut off of each demigorge, and the flanks D G, E F, are raiſed perpendicular to the curtin.

HALF-SEAL, that uſed in the court of chancery, for ſealing commiſſions to delegates, upon any appeal, in eccleſiaſtical or marine cauſes.

HALF-TANGENTS. See the articles TANGENT and SCALE.

HALF TONGUE, *medietas linguæ*, among lawyers. See the article MEDIETAS.

HALI, **HALY**, or *powder of* HALI. See the article POWDER.

HALIÆTUS, in orinthology, a name uſed by ſome for the bald buzzard. It is of the ſize of a large cock, and its head is white, whence it has got the epithet bald, becauſe at a diſtance it appears as if there were no feathers on it.

HALIFAX, the capital town of Nova Scotia in North America, ſituated in 64° weſt long. and 45° north lat.

This is alſo the name of a large market town of Yorkſhire, 34 miles ſouth-weſt of York: weſt long. 1° 40′, north lat. 53° 45′.

HALIOTIS, the EAR-SHELL, in conchyliology, a ſimple ſhell without any hinge, and formed all of one piece, of a depreſſed figure, very patent at the mouth, having an approach to the ſpiral form at the ſummit, and having ſeveral perforations on the lateral part of the diſk. It has got the name ear-ſhell from its figure. See EAR and AURIS.

facing page 1553

Plate CXXV

Fig. 1. HALF MOON.

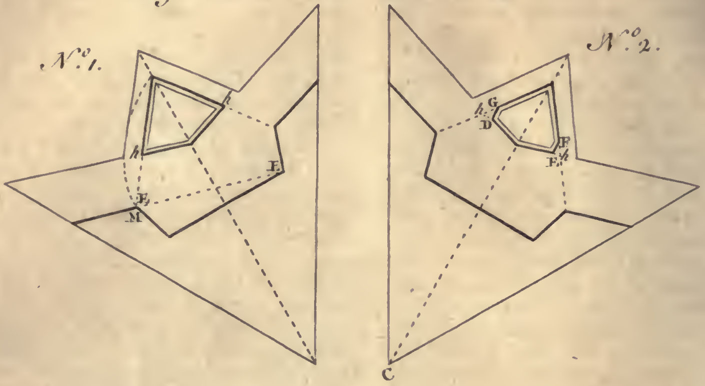
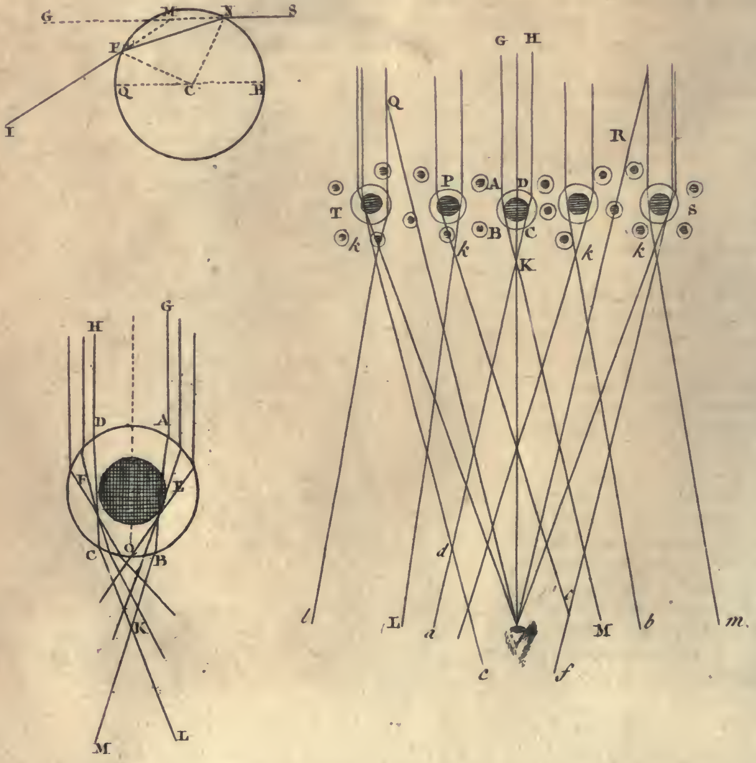


Fig. 2. HALO.



T. Jefferys sculp

HALL, in architecture, a large room at the entrance of a fine houſe and palace. Vitruvius mentions three kinds of halls; the tetraſtyle, with four columns, ſupporting the platfond, or ceiling; the corinthian, with columns all round let into the wall, and vaulted over; and the egyptian, which had a periſtyle of inſolated corinthian columns, bearing a ſecond order with a ceiling.

The hall is properly the fineſt as well as firſt member of an apartment; and in the houſes of miniſters of ſtate, magiſtrates, *&c.* is the place where they diſpatch buſineſs, and give audience. In very magnificent buildings, where the hall is larger and loftier than ordinary, and placed in the middle of the houſe, it is called a ſaloon. See APARTMENT.

HALL, in old writers, is alſo uſed for a manſion-houſe; and to this day, in many parts of the kingdom, gentlemen's ſeats are called halls.

HALL is alſo a public building, or court of juſtice, as Weſtminſter-hall, Guild-hall, a company's hall, *&c.*

In Weſtminſter-hall are held the courts of King's bench, Common-pleas, Chancery, and Exchequer. See the articles KING'S BENCH, COMMON-PLEAS, *&c.*

HALL, in geography, a town of Germany, in the circle of Auſtria, and county of Tyrol, ſituated ſix miles north-eaſt of Inſpruck: eaſt long. 11° 28′ north lat. 47° 15′.

HALL is alſo a town of the Auſtrian Netherlands in the province of Brabant, ſeven miles ſouth of Bruſſels: eaſt long. 4° 10′, north lat. 50° 50′.

HALL is alſo a city of Germany, in the circle of Upper Saxony, the capital of a dutchy ſituated on the river Sala, ſubject to the king of Pruſſia: eaſt long. 12° 5′ north lat. 51° 35′.

HALL is alſo a town of Germany, in the circle of Swabia, twenty miles eaſt of Hailbron; being an imperial city, or ſovereign ſtate: eaſt long. 9° 45′, north lat. 49° 20′.

HALLAGE, a fee or toll paid for cloth brought to be ſold in Blackwell-hall, London.

HALLAMAS, the ſame with all-ſaints. See the article ALL-SAINTS.

HALLATON, a market town, ten miles ſouth-eaſt of Leiceſter.

HALLAND, a ſubdiviſion of Gothland, in Sweden, at the entrance of the Baltic.

HALLEIN, a town of Bavaria, eight miles ſouth of Saltzburg.

HALLELUJA, a word ſignifying, praiſe the Lord.

The ſinging halleluja was a ſort of invitatory, or call to each other, to praiſe the Lord.

St. Auſtin ſays, that in ſome churches, it was ſung only on Eaſter-day, and the fifty days of Pentecoſt; but that even in thoſe churches where it was moſt in uſe, it was never uſed in the time of Lent. The fourth council of Toledo forbids the ſinging it, not only during Lent, but on all other days of faſting; and by the ſame council it is appointed to be ſung after the reading of the goſpel. It was alſo ſung at funerals, as St Jerom informs us in his epitaph of Fabiola, where he ſpeaks of the whole multitude ſinging pſalms together, and making the golden roof of the church ſhake with echoing hallelujas.

HALLEN, a town of the Auſtrian Netherlands, in the province of Brabant: eaſt long. 5°, north lat. 50° 55′.

HALLEIN, a town of Germany, in the archbiſhopric of Saltzburg: eaſt long. 13° 6′, north lat. 47° 36′.

HALLER, a town in the Netherlands, in the province of Brabant: eaſt long. 5°, north lat. 50° 40′.

HALLERIA, in botany, a genus of the didynamia-angioſpermia claſs of plants, the flower of which is monopetalous and ringent, with a quadrifid limb: the fruit is a berry, containing two cells, with a ſolitary ſeed.

HALMSTAT, a port town of Gothland in Sweden, eighty miles ſouth of Gottenberg: eaſt longitude 13° 5′, north lat. 56° 45′.

HALO, in phyſiology, a meteor in the form of a luminous ring or circle, of various colours, appearing round the bodies of the ſun, moon, or ſtars. See the articles COLOUR, SUN, *&c.*

Concerning the production of halos, Sir Iſaac Newton intimates, that they are formed by the light which comes through the drops of rain, by two refractions, *viz.* at N and F (plate CXXV. fig. 2. n° 1.) without any reflection; but how this may be, is not eaſy to conceive.

A rainbow, or deeply coloured ring, as will be ſhewn under rainbow, might have been expected at the diſtance of about thirty-eight degrees from the ſun; and alſo why it cannot happen. See the article RAINBOW.

For the ſame reaſon we ſhould alſo not expect an halo to be formed by the ſame refracted rays, *viz.* on account of their not being refracted parallel to the eye, and conſequently not entering it denſe enough to render that part of the heaven more luminous than the reſt; or to produce the lucid ring we call by this name. Again, Sir Iſaac ſays, it ought to appear ſtrongeſt at the diſtance of about twenty-ſix degrees from the ſun, *viz.* when the angle I M G = 26°, and to decay gradually both ways. But though that philoſopher did not undoubtedly aſſert any thing without very great reaſon, yet this does not appear to us. For that the angle I M G may be twenty-ſix degrees, the angle of incidence B C N muſt be about forty-ſix; and then the angle of refraction C N F will be near thirty-three degrees: but why ſuch an incidence and refraction ſhould cauſe the rays to be refracted in greater plenty to the eye than any other, does not appear to me, ſays Martin, nor can I find it by any experiment. On the contrary, as the angle I M G increaſes with the angle of incidence, and conſequently with the angle of refraction, it is evident that with reſpect to heterogeneal light, the greater the angle I M G is, the more will it be refracted and ſcattered; and conſequently the farther the drops are ſituated from the ſun, the leſs denſe will be the light tranſmitted by refraction to the eye, which therefore ought to decreaſe, as the diſtance of the ſun increaſes. See the article REFRACTION.

As Sir Iſaac Newton has ſaid but little, ſo his expoſitors Dr. 'S Graveſande and Dr. Pemberton have thought fit to be abſolutely ſilent on this head. Mr. Huygens has advanced an hypotheſis by which the phænomenon may be ſolved, if we grant him the following poſtulatum, *viz.* That there are certain globules in the atmoſphere, conſiſting of a coat or ſhell of tranſparent ice or water, containing an opake nucleus or kernel within; and that theſe are made from particles of ſnow, which is in itſelf opake, attracting the aqueous particles in the vapour or exhalation by which it is ſuſtained, which gathering together, form the ſemipellucid ſhell of water, or are frozen into a cryſtalline ſhell of ice; and this, he thinks, is proved to be matter of fact by the hailſtones which fall to the earth: for theſe, ſays he, when broken, diſcover ſome ſnow at the center.

Theſe things premiſed, he addreſſes himſelf to the ſolution, as follows. Let A B C D *(ibid.* n° 2.) repreſent ſuch a globule with the opake nucleus E F in the middle of it; and let us ſuppoſe the rays coming from G, H, to fall on the ſide A D. It is manifeſt they will be refracted inwards from the ſurface A D; from whence it follows that a great number of them muſt ſtrike upon the kernel E F. Let G A, and H D, be the rays which, after refraction, touch the ſides of the kernel E F, and let them be refracted again at B and C, emerging in the lines B K, and C K, croſſing each other in the point K, whoſe diſtance from the globule is ſomewhat leſs than its ſemidiameter. Wherefore, if B K and D K be produced towards M and L, it follows that no light coming from the ſun through the globule, can proceed to the eye any where placed within the angle L K M, or rather in the cone which that repreſents; ſuppoſing that the obliquity of the incident rays H D and G A is ſuch as ſhall make the arch Q C, and Q B, the greateſt poſſible: for then all the rays exterior to H D and G A, will be refracted nearer to Q, and after emergence croſs each other in a point *k*, nearer the globule than the former; and therefore cannot come at the eye placed within the ſaid cone L K M. Suppoſe now the eye placed at N, *(ibid,* n° 3.) and let N R, N Q, be drawn parallel to L K, and M K; then it is plain none of the globules, the ſame as A B C D, within the cone R N Q, can come to the eye at N. Thus the globules at O and P have their refracted rays *a k b* and *c k d*, including the eye in the cone of obſcurity. But other globules which lie without the cone Q N R, as S and T do not involve the eye N by their ſhadow-cones *l k c*, and *f k m*; and therefore ſome of thoſe rays which are more refracted than *k c*, or *k f*, will fall upon the eye, and produce a luminous circular ring or corona, including a dark area within, and whoſe light outwardly decreaſes as it is more remote from the center.

HALSFANG, or HEALSFANG, in old writers, the ſame with pillory. See the article PILLORY.

Sometimes it ſignifies a mulct, paid to be exempted from that puniſhment.

HALSTEAD, a market-town of Eſſex, ſixteen miles north of Chelmsford.

HALTER, in the manege, a headſtall of hungary leather, mounted with one and ſometimes two ſtraps, with a ſecond throat-band, if the horſe is apt to unhalter himſelf.

HALTER-CAST, among farriers, an excoriation of the paſtern occaſioned by a horſe's endeavouring to ſcrub the itching part of his body near the head and neck, when one of his hinder feet entangling in the halter, he ſometimes receives very dangerous hurts in the hollow of his paſtern by his ſtruggling to diſengage himſelf.

For the cure of this take linſeed-oil and brandy, of each an equal quantity; ſhake them together in a bottle till they are well mixt, and anoint the place morning and evening; having firſt clipt away the hair; but take care to keep the foot very clean.

HALTERISTS, *halteriſtæ*, in antiquity, a ſort of players of diſcus, ſo called from the greek ἅλτηρ; which is ſuppoſed to have been a leaden weight or ball, carried in each hand with a view to poiſe their bodies.

HALTING, among farriers, a limping or going lame, an irregularity in the motion of an horſe, ariſing from a lameneſs in the ſhoulder, leg, or foot, which makes him ſpare the part, or uſe it timorouſly. Halting happens ſometimes before, and ſometimes behind; if it be before, the ailment muſt neceſſarily be either in the ſhoulder, knee, flank, paſtern, or foot. If it be in the ſhoulder, it muſt be towards the withers, or in the pitch of the ſhoulder; and it may be known by his drawing one of his legs after him, and not uſing it ſo nimbly as the other. If he caſt it more outward than the other, it is a ſign of lameneſs, and that the grief lies in the ſhoulder; and if you turn him ſhort, on either hand, you will find that he will either favour that leg, or trip in turning. His lameneſs may alſo be ſeen by his ſtanding in the ſtable, where he will hold the ſame leg more out than the other. If when you are upon his back, he complains more than he uſually does, the grief certainly lies in the withers, ſo that on griping him hard, you will perceive him to ſhrink, or perhaps offer to bite. If he treads thick and ſhort before, then the grief is upon the pitch of the ſhoulder, cloſe to the breaſt, which may be diſcovered by preſſing the thumb hard againſt the place, on which he will ſhrink, and put back his leg, foot, and body. If the grief be in the elbow, it may be known by pinching him with the fore-fingers and the thumb, and then he will hold up his leg and offer to bite; but if the grief be in the knee, it may be diſcovered by the ſtiffneſs of his going; for he will not bend it ſo nimbly as he does the other. If it be in the flank or ſhin-bone, the ſame may be ſeen or felt, it being a back ſinew, ſplenter, ſtrain, or the like. If it be in the bend of the knee, it is a malander, which is alſo eaſily diſcovered. Further, when the paſtern or joint is affected, it may be known by his not bending it ſo well as the other, and by its being very hot. If it be in the foot, it muſt be either in the coronet or ſole; if in the coronet, it probably came by ſome ſtrain or wrench: if in the hoof, by ſome over-reach or diſtemper in or about the fruſh: if in the ſole, from ſome prick, accloy, nail, *&c.*

HALTWESEL, a market town of Northumberland, thirty-two miles weſt of Newcaſtle: weſt long. 2°, north lat. 55°.

HALYMOTE, in old law-books, ſignifies a holy or eccleſiaſtical court. See the article COURT.

HALYWERCFOLK, in old writers, were perſons who enjoyed land, by the pious ſervice of repairing ſome church, or defending a ſepulchre.

This word alſo ſignified ſuch perſons in the dioceſe of Durham, as held their lands to defend the corps of St. Cuthbert, who from thence claimed the privilege of not being forced to go out of the biſhopric.

HAM, in anatomy, the part behind the knee. See KNEE and LEG.

HAM, in old writers, a Saxon word uſed for a home or dwelling-place, for a borough and a village, and alſo for a little narrow ſlip of meadow.

HAM, in geography, a city of Germany, in the circle of Weſtphalia, and the capital of the county of Mark, ſubject to Pruſſia: eaſt long. 7° 15′, north lat. 51° 35′.

HAM, in cookery, the leg and thigh of a hog ſeaſoned and dried.

To ſalt a ham in imitation of thoſe of Weſtphalia: let the ham be of young pork, ſprinkle it with ſalt for one day, that it may fetch out the blood; then wipe it dry, and rub it with the following mixture: take a pound of brown ſugar, a quarter of a pound of ſaltpetre, half a pint of bay-ſalt, and three pints of common ſalt; ſtir theſe together in an iron pan over the fire, till they are pretty hot, and then rub the leg of pork with it; let it lie three weeks in this ſalting, frequently turning it, and then dry it in a chimney.

HAMADAN, a city of Perſia, in the province of Eyrac Agem, 200 miles north-weſt of Iſpahan: eaſt long. 47° 35′, north lat. 35°.

HAMADRYADS, in heathen theology, certain rural deities; being nymphs of the woods, whoſe fate depended on certain trees, together with which they were ſuppoſed both to be born and to die.

It was principally with oaks that theſe deities were thus united; and theſe nymphs were ſuppoſed to ſhew extraordinary gratitude to thoſe who preſerved them from death. As for thoſe who deſtroyed the trees on which their life depended, they were ſure to be puniſhed for it in an exemplary manner.

It was eaſy for the gentiles to fall into the opinion of theſe ſort of divinities; for as they entertained a kind of religious veneration for ſuch trees as were very old, and of an uncommon ſize, it was an eaſy tranſition to the belief, that they were the abode and reſidence of ſome deity.

HAMAMELIS, in botany, a genus of the tetrandria-digynia claſs of plants, the corolla of which conſiſts of four linear, equal, and very long petals: the fruit is a bivalve capſule, containing two cells: the ſeed is a ſingle nucleus, of an oblong oval figure, and ſmooth ſurface.

HAMAXOBIANS, *hamaxobii*, an antient people of european Sarmatia, ſo called from their living together in chariots or waggons, for the conveniency of ſhifting the place of their abode at pleaſure.

HAMBLING, or HAMELLING, in the foreſt-law, is the ham-ſtringing of dogs, or cutting the great tendon called the ham-ſtring.

HAMBURGH, a large city and well fortified port-town of Germany, in the circle of lower Saxony, and dutchy of Holſtein, ſituated on the north-ſide of the river Elbe, partly on iſlands, and partly on the continent. It is an imperial city, or ſovereign ſtate, governed by its own magiſtrates, and ſubject only to the general laws of the empire. Merchants from all parts of Europe reſort to it, from whence their goods are ſent into the heart of the empire: eaſt long. 9° 40′, north lat. 54′.

HAMBURGH COMPANY *of merchants*. See the article COMPANY.

HAMCHEU, the capital of the province of Chekiam, in China, ſituated on the river Cienton, 160 miles ſouth-eaſt of Nanking: eaſt long. 120°, north lat 30°.

HAMELIN, a town of Germany, in the circle of lower Saxony, and dutchy of Brunſwic, ſubject to the elector of Hanover: eaſt long. 9° 12′, north lat. 52° 15′.

HAMILTON, a town of Scotland, in the county of Clydſdale, ſituated on the river Clyde, eleven miles ſouth-eaſt of Glaſgow: weſt long. 3° 50′, north lat. 55° 40′.

HAMLE, the name of the eleventh month of the ethiopian year, beginning on the 25th of June, old ſtyle.

HAMLET, HAMEL, or HAMPSEL, is a ſmall village, or part of a pariſh.

HAMMER, a well known tool uſed by mechanics, conſiſting of an iron-head, fixed croſs-wiſe upon a handle of wood.

There are ſeveral ſorts of hammers uſed by black-ſmiths; as, 1. The hand-hammer, which is of ſuch weight that it may be weilded or governed with one hand at the anvil. 2. The up-hand ſledge, uſed with both hands, and ſeldom lifted above the head. 3. The about-ſledge, which is the biggeſt hammer of all, and held by both hands at the fartheſt end of the handle, and being ſwung at arms-length over the head, is made to fall upon the work with as heavy a blow as poſſible. There is alſo another hammer uſed by ſmiths, called a rivetting-hammer, which is the ſmalleſt of all, and is ſeldom uſed at the forge, unleſs upon ſmall work. See Plate of Smithery.

Carpenters and joiners have likewiſe hammers accommodated to their ſeveral purpoſes. See Plate of Joinery.

HAMMER, *malleus*, in anatomy. See the articles EAR and MALLEUS.

HAMMER *of a clock*. See CLOCK.

Yellow-HAMMER, in ornithology. See YELLOW-HAMMER.

HAMMER HEADED SHARK, in ichthyology, the ſame with the zygæna. See the article ZYGÆNA.

Coining with the HAMMER. See the article COINING.

HAMMOCK, in a ſhip, a piece of canvas hung up faſt by the four corners between decks, for ſeamen to ſleep in.

HAMMON, or AMMON, in antiquity, a name given to Jupiter in Lybia, where was a celebrated temple of that deity. See AMMON.

HAMMONT, a town of Germany, in the circle of Weſtphalia, and biſhopric of Liege, ſituated near the confines of Brabant: eaſt long. 5° 32′, north lat. 51° 20′.

HAMPER, or HANPER, in chancery. See the article HANPER.

HAMPSHIRE, an engliſh county, bounded by Berkſhire, on the north; by Surrey and Suſſex, on the eaſt; by the engliſh channel, on the ſouth; and by Wiltſhire and Dorſetſhire, on the weſt. It comprehends the iſle of Wight. Its chief towns are Wincheſter, Southampton, and Portſmouth.

New HAMPSHIRE, a province of New England, in north America, bounded by Nova Scotia, on the north; by the Atlantic ocean, on the eaſt; by the province of Maſſachuſets-bay, on the ſouth; and by New York, on the weſt: ſubject to Great Britain.

HAMSTEAD, a pleaſant village in Middleſex, four miles north of London.

HAMSOKEN, in old law-books, ſignifies the liberty or privilege a man enjoys in his own houſe. It is alſo ſaid to ſignify a franchiſe granted to lords of manors, by which they hold pleas, and take cogniſance of the breach of that immunity. In Scotland it is uſed for the crime of him that violently, and contrary to the peace, aſſaults a perſon in his own houſe.

HAMPTON, a market town of Glouceſterſhire, twelve miles ſouth of Glouceſter: weſt long. 2° 15′, north lat. 51° 38′.

HAMPTON, is alſo a port-town of New Hampſhire, forty miles north of Boſton: weſt long. 70°, north lat. 42° 35′.

HAMPTON-COURT, a town in Middleſex, ſituated on the north ſide of the Thames, twelve miles weſt of London, and two weſt of Kingſton; in which is the fineſt palace belonging to the king of England.

HANAPER, or HANPER, in chancery. See the article HANPER.

HANAU, the capital of a county of the ſame name in Germany, is pleaſantly ſituated on the river Kunts, thirteen miles eaſt of Francfort, and twelve north-weſt of Aſchaffenburgh: eaſt long. 8° 45′, north lat. 50° 12′.

HANCES, in a ſhip, are falls or deſcents of the fiſe rails, which are placed from the ſtern down to the gang-ways.

HAND, *manus*, in anatomy, the extreme part of the arm. See the article ARM.

The bones of the hand are thoſe of the carpus, metacarpus, and fingers, with the oſſa ſeſamoidea. See CARPUS, *&c.*

The gibbous or convex part of the two firſt of theſe bones, conſtitutes the back of the hand; and the hollow part, the palm. Their bodies are placed diſtant from each other, and the interſtices between them are filled up with the muſcles called muſculi interoſſei, ſerving to move the fingers.

As for the muſcles of the hands, ſee FINGER, WRIST, METACARPUS, *&c.*

The mechaniſm of the hand, is admirably contrived to anſwer the manifold uſes and occaſions wherein it is employed, being made up not only of nerves, muſcles, *&c.* but a great number of little bones, all curiouſly jointed into each other; whence its extraordinary flexibility, which enables it to lay hold of adjacent bodies.

Luxation of the HAND, in ſurgery. The hand is ſaid to be luxated forwards, or inwards, when it recedes from the muſcles that bend the fingers; the luxation is ſaid to be backward, when it departs from the muſcles which extend the fingers; and when the carpus makes a tumour near the thumb, and a cavity near the little finger, the luxation is ſaid to be outward.

To reduce luxations of the hand, it muſt be ſufficiently extended by two aſſiſtants; one of whom is to lay hold of the hand, and the other of the humerus, pulling in oppoſite directions; then the part of the hand where the ſinus is, muſt be placed on a flat table, that whatever ſticks out may be depreſſed by the ſurgeon, and the hand reduced into its natural ſtate.

HAND, in the manege, a meaſure of four inches, or of a clinched fiſt, by which the height of a horſe is computed. Thus, a horſe of war ſhould be ſixteen hands high.

Hand is alſo uſed for the diviſion of a horſe, into the fore and hind parts. The parts of the fore-hand, are the head, neck, and fore-quarters; and thoſe of the hind-hand, include all the other parts of his body.

Hand is alſo uſed for the horſeman's hand. Thus ſpear-hand, or ſword-hand, is the horſeman's right-hand; and bridle-hand, is his left-hand. And as the bridle hand gives motion to the bit, and ſerves to guide the horſe more than the other helps, there are ſeveral expreſſions which relate to it. As, this horſeman has no hand, that is, he makes uſe of the bridle unſeaſonably, and does not know how to give the helps of the hand with due nicety. To keep a horſe upon the hand, is to feel him in the ſtay upon the hand, and to be prepared to avoid any ſurpriſal or diſappointment from the horſe. A horſe is ſaid to lie or to reſt upon the hand, that never refuſes, but always obeys the hand. A good horſeman ought to have a light hand; that is, he ought to feel the horſe upon his hand, only that he may reſiſt him when he attempts to ſlip from it; and inſtead of cleaving to the bridle, he ſhould lower it, as ſoon as he has made his reſiſtance: thus if a horſe, through his eagerneſs to go forward, preſſes too much upon the hand, the rider ought, at certain times, to ſlack his hand, and at other times to keep a hard hand, that he may diſappoint the horſe, and prevent his preſſing continually upon the bit; and this facility of ſlackening and ſtiffening the hand, is what is called a good hand. A horſe is ſaid to force the hand, when he does not fear the bridle, but runs away in ſpite of the horſeman. To make a horſe part from the hand, or to ſuffer him to ſlip from the hand, is to put on at full ſpeed. To work a horſe upon the hand, is to manage him by the effects of the bridle, without any other helps, except, upon occaſion, thoſe of the calves of the legs.

To make a horſe right upon the hand, and free in the ſtay, he muſt be taught, by degrees, and by gentle methods, to know the hand; the horſeman muſt turn him, or change hands, ſtop him, or manage with dexterity the preſſure of his mouth, ſo as to make him ſuffer chearfully and freely the effect of the bit, without reſiſting or reſting heavy upon the hand.

HAND-BARROW, a weel-barrow, which is in great uſe in fortification, for carrying earth from one place to another, and in a ſiege, for carrying bombs or cannon-balls along the trenches.

HAND-BOROW, in law-books, a ſurety, or manual pledge, of an inferior rank; as he d-borow ſignifies a chief or ſuperior.

HAND-BREADTH, a meaſure of three inches.

HAND-CUFFS, an inſtrument formed of two circular pieces of iron, each fixed on a hinge on the ends of a very ſhort iron bar, which being locked over the wriſts of a malefactor, prevents his uſing his hands.

HAND-HABEND, in law-books, a thief caught with the ſtolen goods about him.

HAND-HOOK, an inſtrument uſed by ſmiths to twiſt ſquare iron.

HAND SCREW, an inſtrument more uſually called a jack. See the article JACK.

HAND SPIKES, wooden levers uſed at ſea to traverſe the ordnance, or to turn the windlaſs in weighing up the anchor, *&c.* They are more commodious than iron crows, becauſe their length allows a better poize.

Harmonical HAND, in muſic, a name given to the antient diagram. See DIAGRAM. The reaſon of this appellation was, that Guido Aretine, upon inventing the notes *ut*, *re*, *mi*, *fa*, *ſol*, *la*, diſpoſed them on fingers, of the figure of a hand ſtretched out. See the article NOTE.

He thus changed the letters of the alphabet, which till that time uſed to expreſs the notes for theſe ſix ſyllables, taken out of the firſt ſtrophe of the hymn of St. John the baptiſt, compoſed by Paulus Dioconus.

Ut *queant laxis* re-*ſonare fibris*
Mi-*ra geſtorum* fa-*muli tuorum,*
Sol-*ve polluti* la-*bii reatum,*
Sancte Johannes.

Impoſition of HANDS, the ceremony of laying the hands on the head of a perſon to be ordained. See ORDINATION.

HANDS, in heraldry, are borne in coat-armour dexter and ſiniſter, that is, right and left, expanded or open. Theſe are the moſt neceſſary parts of the human body, as they ſerve to expreſs all ſorts of actions, and even our very thoughts and deſigns; thus joining of hands is an univerſal token of friendſhip, and clapping of hands a general mark of applauſe.

HANDLING, among cock-fighters, ſignifies the meaſuring the girth of a cock's body, by the hands.

HANGINGS, the linings of rooms, whether made of paper, arras, or the like.

HANKWITE, or HANGWITE, a fine impoſed for hanging a felon or thief, without due courſe of law, or for ſuffering him to eſcape out of legal cuſtody. Thus to be quit of hangwite, denotes a freedom from the penalty above-mentioned.

HANOVER, a city of Germany, in the circle of Lower Saxony, and dukedom of Brunſwic, ſituated on the river Leina, thirty-ſix miles weſt of Brunſwic: it is the capital of his britannic majeſty's german dominions, ſituated in eaſt long. 9° 45′, north lat. 52° 32′.

HANPER, HANAPER, or HAMPER, an office of the chancery, anſwering to the fiſcus of the Romans.

Clerk of the HANPER, or HAMPER. See the article CLERK.

HANSE, or HANS, a company of merchants united for the promotion and advantage of trade.

HANSE-TOWNS, port-towns of Germany, of which Lubec and Hamburgh were the chief. They were formerly all of them imperial cities, confederated for their mutual defence, and the protection of their trade.

HAP, in a legal ſenſe, ſignifies to catch the rent, where partition is made between two parceners, and more land is allowed to one than the other, and ſhe who has moſt of the land charges it to the other, who haps the rent, *&c.*

HAPPINESS, among philoſophers, conſiſts in the enjoyment not only of the goods of the body, as health, ſtrength, neatneſs, decency, *&c.* but alſo of the more refined goods of the mind, as knowlege, memory, taſte, and eſpecially the moral virtues, magnanimity, fortitude, benevolence, *&c.*

Human happineſs, in the preſent ſtate of things, conſiſts of many ſeparate and little rivulets, which muſt often be left dry in the perpetual flux and reflux of human affairs; yet the main ſtream, with which theſe leſſer ones generally communicate, flows from within, from the heart of man; and, if this be ſound and clear, happineſs will roll on though life with a ſtrong and equal current. Many of the inferior goods that enter the account of happineſs, as health, fame, fortune, and the like, are often even after our utmoſt care unattainable, or at leaſt precarious; it is therefore of the utmoſt conſequence to be prepared againſt the want or loſs of them, by having our deſires moderated, and our paſſions under due command. And, let it be remembered, that it is not only of great importance to our eaſe and ſecurity againſt ill, but one of the higheſt improvements of virtue, to contemn what is thus unattainable and precarious, to contemn thoſe things the contempt of which is truly great and heroic, and to place our happineſs chiefly in thoſe virtuous exerciſes and affections which ariſe from a pure and well diſpoſed mind, an happineſs which no condition in life can exclude, no change of fortune interrupt or deſtroy. This will arm and fortify the mind againſt thoſe pains, which reſult to the generality of mankind, from the contrary evils.

Hence it is evident, 1. That the happineſs of ſuch a creature as man, can never be at a ſtand, or continue a fixed invariable thing. His finite nature, let it riſe ever ſo high, admits ſtill higher degrees in improvements and perfection. And his progreſſion in improvement, or virtue, always makes way for a progreſſion in happineſs, ſo that no poſſible point can be aſſigned in any period of his exiſtence in which he is perfectly happy; that is, ſo happy as to exclude higher degrees of happineſs. All his perfection is only comparative. 2. It appears that many things muſt conſpire to complete the happineſs of ſo variable a creature as man, ſubject to ſo many wants, and ſuſceptible of ſuch different pleaſures. 3. As his capacities of pleaſure cannot be all gratified at the ſame time, and muſt often interfere with each other in ſuch a precarious and fleeting ſtate as human life, or be frequently diſappointed, perfect happineſs, *i. e.* the undiſturbed enjoyment of the ſeveral pleaſures of which we are capable, is unattainable in our preſent ſtate. 4. That ſtate is moſtly to be ſought after, in which the feweſt competitions and diſappointments can happen, which leaſt of all impairs any ſenſe of pleaſure, and opens an unexhauſted ſource of the moſt refined and laſting enjoyments. 5. That ſtate which is attended with all thoſe advantages, is a ſtate or courſe of virtue. 6. Therefore, a ſtate of virtue, in which the moral goods of the mind are attained, is the happieſt ſtate.

HARAM, in the Turkiſh ſeraglio. See the article SERAGLIO.

HARANGUE, a ſpeech made by an orator in public.

It is frequently uſed for a too pompous and prolix declamation.

HARBINGER, an officer of the king's houſhold, having four yeomen under him, who ride a day's journey before the court, when it travels, to provide lodgings, *&c.*

HARBOROUGH, a town of Leiceſterſhire, thirteen miles ſouth-eaſt of Leiceſter: weſt long. 1°, north lat. 52° 26′.

HARBOUR, a place where ſhips may ride ſafe at anchor, chiefly uſed in ſpeaking of thoſe ſecured by a boom and chain, and furniſhed with a mole. See the articles BOOM, CHAIN, and MOLE.

By many acts or parliament, perſons caſting and unlading ballaſt, rubbiſh, or the like, in any harbour or haven, forfeit 5l.

HARBOURING, among ſportſmen, is ſaid of a hart that goes to reſt: hence to unharbour a deer, is to diſlodge him.

HARBURGH, a port-town of Germany, in the circle of Lower Saxony, and dutchy of Lunenburg, ſituated on the river Elbe, oppoſite to Hamburg: eaſt longitude 9° 30′, north latitude 53° 57′.

HARCOURT, a town of France, in the province of Normandy, twenty-three miles ſouth-weſt of Rouen.

HARDENING, the giving a greater degree of hardneſs to bodies than they had before. See the article HARDNESS.

There are ſeveral ways of hardening iron and ſteel, as by hammering them, quenching them, when hot, in cold water, caſe-hardening, *&c.*

To harden engliſh and ſwediſh ſteel, being heated pretty hot, it is ſuddenly plunged in water; but ſpaniſh and venice ſteel requires only a blood-red heat, before it is quenched in the water: ſometimes the ſteel is rubbed with a woollen rag, dipt in a mixture of powdered indigo and ſallad-oil, while it is heating, and afterwards let cool of itſelf.

Caſe-**HARDENING** is performed after the following manner: take cow-horn or hoof, dry it well in an oven; pound it to powder; put as much bay-ſalt as of this powder into ſtale urine, or white-wine vinegar, and mix them well together; then cover the iron or ſteel with this mixture, and wrap it up in loam or plate-iron, ſo that the mixture may touch every part of the work; then put it into the fire, and blow the coals till the whole lump has a blood-red heat, but no higher, and then take it out and quench it.

HARDERWICK, a town of Guelderland, in the United Netherlands, twenty-three miles north-weſt of Zutphen: eaſt long. 5° 30′, north lat 52° 35′.

HARDNESS, in phyſiology, that quality in bodies whereby their parts cohere firmly together, ſo as not to give way to any external impulſe, nor yield inwards, without breaking.

In this ſenſe hardneſs coincides with what on other occaſions we call firmneſs, in oppoſition to ſoftneſs and fluidity.

From that ſpecies of attraction called coheſion, it is eaſy to account for the different degrees of hardneſs in bodies: thoſe whoſe conſtituent particles are flat or ſquare, and ſo ſituated as to touch in many points, will be hard; thoſe particles which are more round, and touch in fewer points, will conſtitute a ſofter body; thoſe which are ſpherical, or nearly of that figure, will form a fluid. See the articles ATTRACTION and COHESION. But nothing can conduce more to explain the nature of this doctrine, than the following paſſage of Sir Iſaac Newton. "The parts of all homogeneal bodies, ſays he, which fully touch one another, ſtick together very ſtrongly. And for explaining how this may be, ſome have invented hooked atoms, which is begging the queſtion; and others tell us, that bodies are glued together by reſt, that is by an occult quality, or rather by nothing; and others, that they ſtick together by conſpiring motions, that is, by relative reſt among themſelves. I had rather infer from their coheſion, that their particles attract one another by ſome force, which in immediate contact, is exceeding ſtrong; at ſmall diſtances, performs many chemical operations, and reaches not far from the particles with any ſenſible effect. All bodies ſeem to be compoſed of hard particles: even the rays of light ſeem to be hard bodies; and therefore hardneſs may be reckoned the property of all incompounded matter: for all bodies, ſo far as experience reaches, are either hard, or may be hardened. Now if compound bodies are ſo hard as we find ſome of them to be, and yet are very porous, and conſiſt of parts which are only laid together, the ſimple particles which are void of pores, and were never yet divided, muſt be much harder. For ſuch hard particles being heaped up together, can ſcarce ever touch one another in more than a few points, and therefore muſt be ſeparable by a much leſs force than is requiſite to break a ſolid particle where parts touch in all the ſpace between them, without any pores or interſtices to weaken their coheſion. And how ſuch very hard particles, which are only laid together, and touch only in a few points, can ſtick together, and that ſo firmly as they do, without the aſſiſtance of ſomething which cauſes them to be attracted, or preſſed towards one another is very difficult to conceive."

There are ſeveral ways, ſays Mr. Boyle, whereby a body may be put into a texture proper to make it hard, though for the moſt part one of them is not employed apart, but two or more in conjunction. The firſt and chiefeſt of theſe ſeem to be the fitneſs and ſhapes of the component particles to faſten them to each other, as if ſome were figured like the handles of buckets, and others like the hooks employed to draw them; ſome like buttons, others like loops; ſome like male, others like female ſcrews; or as if many together were ſo variouſly branched, that their parts may be interwoven one with another, and not prove eaſily ſeparable: thus only, by twiſting threads together, they are ſo well faſtened to one another as to conſtitute a cable, which is not to be broken without a vaſt force. See the article ATOM.

And ſo numerous may be the correſpondent figures fit to faſten bodies to one another, that it is very poſſible for two fluids, upon their conjunction, to intangle their parts, and thereby acquire ſuch a new texture, that they cannot diſſociate themſelves, nor flow after the manner of liquors, but remain connected and unactive, as to become one intire hard body. See the article FREEZING.

HARDS, or HURDS, the coarſer part of hemp or flax, ſeparated from the fine. See the articles HEMP and FLAX.

HARE, in zoology, an animal of the lepus kind, diſtinguiſhed by its abrupt tail, and black eyes. It greatly reſembles the rabbit, but is larger, and ſomewhat longer, in proportion to its thickneſs; and its ears are remarkably long, being always in a poſition to receive the leaſt ſound, and moveable with ſurpriſing eaſe. See plate CXXVI. fig. 1.

The hare is a beaſt of venery, or of the foreſt, but peculiarly ſo termed in the ſecond year of her age. There are reckoned four ſorts of them, from the place of their abode: ſome live in the mountains, ſome in the fields, ſome in marſhes, and ſome wander about every where. The mountain-hares are the ſwifteſt, the field-hares are not ſo nimble, and thoſe of the marſhes are the ſloweſt; but the wandering hares are the moſt dangerous to follow, for they are cunning in the ways and mazes of the fields, and knowing the neareſt ways, run up the hills and rocks, to the confuſion of the dogs, and the diſcouragement of the hunters. See the article HUNTING.

HARE-LIP, *labium leporinum*, in ſurgery. See the article LIP.

HARE'S EARS, *bupleurum*, in botany. See the article BUPLEURUM.

HARE'S LETTUCE, a name ſometimes given to the ſonchus, or ſow-thiſtle.

HARE-STRONG, the ſame with peucedanum, or hog's fennel.

HARFLEUR, a port-town of France, in the province of Normandy, ſituated near the mouth of the Seyne, four miles weſt of Havre de Grace: eaſt long. 15′, north lat. 49° 30′.

HARIOT, or HERIOT, in law, a due belonging to a lord at the death of his tenant, conſiſting of the beſt beaſt, either horſe, ox, or cow, which he had at the time of his death; and in ſome manors, the beſt goods, piece of plate, *&c.* are called hariots.

There is both hariot-ſervice, and hariot-cuſtom: when a tenant holds by ſervice to pay a hariot at his deceaſe, which is expreſsly reſerved in the deed of feofment, this is a hariot-ſervice; and where hariots have been cuſtomarily paid time out of mind, after the death of a tenant for life, this is termed hariot-cuſtom. For hariot-ſervice, the lord may diſtrain any beaſt belonging to the tenant, that is on the land. For hariot-cuſtom, the lord is to ſeiſe and not diſtrain; but he may ſeiſe the beſt beaſt that belonged to the tenant, tho' it be out of the manor, or in the king's highway, becauſe he claims it as his proper goods by the death of his tenant. Nevertheleſs, where a woman marries and dies, the lord ſhall have no hariot-cuſtom, becauſe a feme-covert has no goods to pay as a hariot.

HARLEBECK, a town of the auſtrian Netherlands, in the province of Flanders, ſituated on the river Lys, ſix miles north-eaſt of Courtray: eaſt long. 3° 15′, north lat. 50° 50′.

HARLEQUIN, a buffoon or merry-andrew; but is now uſed for a perſon of extraordinary agility, dreſſed in party-coloured cloaths, the principal character in a pantomime entertainment. See the article PANTOMIME.

HARLESTON, a market-town of Norfolk, ſituated on the river Waveney, fourteen miles ſouth of Norwich: eaſt long. 1° 25′, north lat. 52° 35′.

HARLINGEN, a port-town of the United Netherlands, in the province of weſt Frieſland, ſituated on the German ſea: eaſt longitude 5° 20′, north latitude 53° 15′.

HARLOT, a whore, or one that proſtitutes her body for hire. Theſe are liable to be committed to priſon, and kept to hard labour. For the puniſhment of thoſe who keep and entertain them, ſee the article BAWDY-HOUSE.

HARLOW, a market-town of Eſſex, ſituated fifteen miles weſt of Chelmsford: eaſt long. 6′, north lat. 51° 45′.

HARMONIA, HARMONY, in muſic. See the article HARMONY.

HARMONIA, in anatomy, a ſpecies of articulation, being a kind of ſymphyſis intended for abſolute reſt. See the article ARTICULATION.

HARMONICA, HARMONICS, among muſicians. See the article HARMONICS.

HARMONICAL, ſomething belonging to harmony. See the article HARMONY.

HARMONICAL ARITHMETIC, that part of arithmetic which conſiders muſical intervals, expreſſed by numbers, in order to our finding their mutual relations, compoſitions and reſolutions.

HARMONICAL COMPOSITION, in a general ſenſe, includes both harmony and melody, *i. e.* of muſic or ſongs, both in a ſingle part; and in ſeveral parts.

In its more proper and limited ſenſe, harmonical compoſition is reſtrained to that of harmony; and may be defined the art of diſpoſing and concerting ſeveral ſingle parts together, ſo as to make one agreeable whole. See HARMONY, COMPOSITION, and COUNTER POINT.

HARMONICAL DIVISION, in muſic. See the artical DIVISION.

HARMONICAL INTERVAL, in muſic, denotes the difference of two ſounds, which is agreeable to the ear, whether in conſonance or ſucceſſion; and are, therefore, the ſame with concord. See the articles CONCORD and INTERVAL.

HARMONICAL PROPORTION. See the article PROPORTION.

HARMONICAL SERIES, a ſeries of many numbers in continual harmonical proportion. Thus if there are four or more numbers, of which every three immediate terms are harmonical, the whole will make an harmonical ſeries: ſuch is 30 : 20 : 15 : 12 : 10. Or, if every four terms immediately next each other are harmonical, it is alſo a continual harmonical ſeries, but of another ſpecies, as 3, 4, 6, 9, 18, 36, &c.

HARMONICAL SOUNDS, an appellation given, by Mr. Sauveur, to ſuch ſounds as always make a determinate number of vibrations, in the time that one of the fundamentals, to which they are referred, makes one vibration.

Harmonical ſounds are produced by the parts of chords, &c. which vibrate a certain number of times, while the whole chord vibrates once.

The relations of ſounds had only been conſidered in the ſeries of numbers, 1 : 2, 2 : 3, 3 : 4, 4 : 5, &c. which produced the intervals called octave, fifth, fourth, third, &c. Mr. Sauveur firſt conſidered them in the natural ſeries, 1, 2, 3, 4, 5, &c. and examined the relations of ſounds ariſing therefrom. The reſult is, that the firſt interval, 1 : 2, is an octave; the ſecond, 1 : 3, a twelfth; the third, 1 : 4, a fifteenth, or double octave; the fourth, 1 : 5, a ſeventeenth; the fifth, 1 : 6, a nineteenth, &c.

This new conſideration of the relations of ſounds, is more natural than the old one; and is, in effect, all the muſic that nature makes without the aſſiſtance of art. See the articles CHORD, ORGAN, &c.

HARMONICS, *harmonica*, that part of muſic which conſidered the differences and proportions of ſounds, with reſpect to acute and grave; in contradiſtinction to rythmica and metrica.

The harmonics is the only part of the antient muſic whereof we have any tolerable account. According to Mr. Malcolm, the doctrine of harmonics was reduced into ſeven parts, *viz.* of ſounds, of intervals, of ſyſtems, of the genera, of the tones or modes, of mutation, and of the melopœia. See the articles SOUND, INTERVAL, &c.

HARMONY; *ἁρμονια*, in muſic, the agreeable reſult, or union, of ſeveral muſical ſounds, heard at one and the ſame time; or the mixture of divers ſounds, which together have an effect agreeable to the ear. See the article SOUND.

As a continued ſucceſſion of muſical ſounds produces melody, ſo does a continued combination of theſe produce harmony. See the article MELODY.

Among the antients, however, as alſo ſometimes among the moderns, harmony is uſed in the ſtrict ſenſe of conſonance, and is equivalent to ſymphony; and concord and harmony do in reality ſignify the ſame thing, though cuſtom has made a little difference between them. See the articles SYMPHONY, &c.

The antients, ſays Mr. Malcolm, ſeem to have been entirely unacquainted with harmony, the ſoul of modern muſic: in all their explications of the melopœia, they ſay not a word of concert, or the harmony of parts. We have inſtances, indeed, continues that author, of their joining ſeveral voices or inſtruments in conſonance; but then theſe voices and inſtruments are not ſo joined as that each had a diſtinct and proper melody, and ſo made a ſucceſſion of various concords; but were either uniſons or octaves in every note; and ſo all performed the ſame individual melody, and ſo conſtituted one ſong.

When the parts differ not in the tenſion of the whole, but in the different relations of the ſucceſſive notes, it is this that conſtitutes the modern art of harmony. See MUSIC.

To underſtand the nature, and determine

mine the number and preference of harmonies, it is to be conſidered, that in every compound ſound, where there are not more than three ſimple ones, there are three kinds of relations, *viz.* primary relation of every ſimple ſound to the fundamental or graveſt, whereby they make different degrees of concord with it; the mutual relations of the acute ſounds each with the other, whereby they mix concord or diſcord into the compound; and the ſecondary relation of the whole, whereby all the terms unite their vibrations, and coincide more or leſs frequently.

Suppoſe four ſounds A, B, C, D, whereof A is the graveſt, B the next, then C, and D the acuteſt. Here A is the fundamental, and the relations of B, C, and D are primary relations: ſo if B be a third greater above A, that primary relation is 4 to 5; and if C be a fifth to A, that primary relation is 2 to 3; and if D be an octave to A, that is 1 to 2.

For the mutual relations of the acute terms B, C, D, they are had by taking their primary relations to the fundamental, and ſubtracting each leſſer from each greater: thus B to C is 5 to 6, a third leſſer; B to D, 5 to 8, a ſixth leſſer, *&c.*

Laſtly, to find the ſecondary relation of the whole, ſeek the leaſt common dividend to all the leſſer terms or numbers of the primary relations, *i. e.* the leaſt number that will be divided by each of them exactly, this is the thing ſought, and ſhews that all the ſimple ſounds coincide after ſo many vibrations of the fundamental as the number expreſſes.

So in the preceding example, the leſſer terms of the three primary relations are 4, 2, 1, whoſe leaſt common dividend is 4, conſequently at every fourth vibration of the fundamental, the whole will coincide.

The proper ingredients of harmony are concords; and all diſcords, at leaſt in the primary and mutual relations, are abſolutely forbidden. It is true, diſcords are uſed in muſic, but not of themſelves ſimply, but only to ſet off the concords by their contraſt and oppoſition. Hence, any number of concords being propoſed to ſtand in primary relations with a common fundamental, we diſcover whether or no they conſtitute perfect harmony, by finding their mutual relations: thus, ſuppoſe the following concord or primary relations, *viz.* the greater third, fifth, and octave given, their mutual relations are all concord, and therefore may ſtand in harmony; for the greater third and fifth are to one another as 5 to 6, a leſſer third; the greater third and octave, as 5 to 8, a leſſer ſixth; and the fifth and octave, as 3 to 4, a fourth. But if fourth, fifth, and octave be propoſed, it is evident they cannot ſtand in harmony, by reaſon between the fourth and fifth there is a diſcord, *viz.* the ratio 8 to 9. Again, ſuppoſing any number of ſounds which are concord each to the next, from the loweſt to the higheſt; to know if they can ſtand in harmony, we muſt find the primary and all the mutual relations, which muſt be all concord: thus the following ones cannot, *viz.* 4, 6, 9, by reaſon 4 to 9 is a diſcord.

The perfection of harmonies depends on all the three relations, it is not the beſt primary relation that makes the beſt harmony; for then a fourth and a fifth muſt be better than a fourth and a ſixth, whereas the firſt two cannot ſtand together, becauſe of the diſcord of the mutual relation. Nor does the beſt ſecondary relation carry it; for then would a fourth and a fifth, whoſe ſecondary relation, with one common fundamental, is 6, be better than a third and fifth, whoſe ſecondary relation is 10: but here alſo the preference is due to the better mutual relations. Indeed, the mutual relations depend on the primary, though not ſo as that the beſt primary ſhall always produce the beſt mutual relations. However, the primary relations are of the moſt importance; and, together with the ſecondary, afford us the following rule for determining the preference of harmonies, *viz.* comparing two harmonies together that have an equal number of terms, that which has the beſt primary and ſecondary relations, is the moſt perfect. But in caſes where the advantage lies in the primary relation of the one, and in the ſecondary of the other, we have no certain rule; the primary are certainly the moſt conſiderable, but how the advantage in theſe ought to be proportioned to the diſadvantage of the other, or *vice verſa*, we know not; ſo that a well-tuned ear muſt be the laſt reſort in theſe caſes.

Harmony is divided into ſimple and compound.

Simple HARMONY is that in which there is no concord to the fundamental above an octave. The ingredients of ſimple harmony are the ſeven original ſimple concords, of which there can be but eighteen different combinations that are harmony, which are gived in the following table from Mr. Malcolm.

TABLE of SIMPLE HARMONIES.

Secondary Relations. Secondary Relations.

Fifth	octave	2	third greater	fifth	4	third greater	fifth		octave
Fourth	octave	3	third leſs	fifth	10	third leſs	fifth		octave
Sixth greater	octave	3	fourth	ſixth greater	3	fourth	ſixth greater		octave
Third greater	octave	4	third greater	ſixth greater	12	third greater,	ſixth greater		octave
Third leſs	octave	5	third leſs	ſixth leſs	5	third leſs	ſixth leſs		octave
Sixth leſs	octave	5	fourth	ſixth leſs	15	fourth	ſixth leſs		octave

Theſe are all the poſſible combinations of the concords, that are harmony; for the octave is compounded of a fifth and a fourth, or a ſixth and a third, which have the variety of greater and leſſer: out of theſe are the firſt ſix harmonies compoſed. Then the fifth being compoſed of a greater and a leſſer third, and the ſixth of a fourth and third; from theſe proceed the next ſix harmonies of the table: then an octave joined to each of theſe ſix, make the laſt ſix of the table.

The perfection of the firſt twelve is, according to the order of the table; of the firſt ſix each has an octave, and their preference is according to the perfection of that other leſſer concord joined to the octave. For the next ſix, the preference is given to the two combinations with the fifth, whereof that which has the third greater is the beſt. For the laſt ſix, they are not placed laſt, becauſe the leaſt perfect, but becauſe they are the moſt complex, and are the mixtures of the other twelve with each other: in point of perfection, they are plainly preferable to the preceding ſix, as having the ſame ingredients with an octave more.

Compound HARMONY is that which to the harmony of one octave, adds that of another. For the compound harmonies, their varieties are eaſily found out of the combinations of the ſimple harmonies of ſeveral octaves.

Harmony may alſo be divided into that of concords and that of diſcords. The firſt is that which we have hitherto conſidered, wherein nothing but concords are admitted: the ſecond is that wherein diſcords are uſed, and mixed with concords. See the articles CONCORD and DISCORD.

Compoſition of HARMONY. See the article COMPOSITION.

HARMONY is alſo ſometimes uſed to denote an agreement, ſuitableneſs, union, conformity, *&c.* thus, in muſic, we ſometimes apply it to a ſingle voice, when ſonorous, clear, and ſoft; to a ſingle inſtrument, when it yields a very agreeable ſound: in matters of literature, we uſe it for a certain agreement between the ſeveral parts of the diſcourſe: in architecture, harmony denotes an agreeable relation between the parts of a building: in painting, they ſpeak of an harmony both in the ordonance and compoſition, and in the colours of a picture; in the ordonance it ſignifies the union or connection between the figures, with reſpect to the ſubject of the piece; in the colours, it denotes the union or agreeable mixture of different colours. See the article COLOURING, *&c.*

HARMONY *of the ſpheres*, or *Celeſtial* HARMONY, a ſort of muſic much talked of by many of the antient philoſophers and fathers, ſuppoſed to be produced by the ſweetly tuned motions of the ſtars and planets. This harmony they attributed to the various proportionate impreſſions of the heavenly globes upon one another, acting at proper intervals. It is impoſſible, according to them, that ſuch prodigious large bodies, moving with ſo much rapidity, ſhould be ſilent; on the contrary, the atmoſphere continually impelled by them, muſt yield a ſet of ſounds proportionate to the impreſſion it receives; conſequently as they do not all run the ſame circuit, nor with one and the ſame velocity, the different tones ariſing from the diverſity of motions, directed by the hand of the Almighty, muſt form an admirable ſymphony, or concert.

They therefore ſuppoſed, that the moon, as being the loweſt of the planets, correſponded to *mi*; mercury, to *fa*; venus, to *ſol*; the ſun, to *la*; mars, to *ſi*; jupiter, to *ut*; ſaturn, to *re*; and the orb of the fixed ſtars, as being the higheſt of all, to *mi*, or the octave.

Pre-eſtabliſhed **HARMONY**, a celebrated ſyſtem of M. Leibnitz, by means whereof he accounts for the union or communication between ſoul and body. The philoſophers had univerſally held, that the ſoul and the body act phyſically on each other. Des Cartes firſt ſhewed that the heterogeneity of their natures did not allow of ſuch real union; and that they could only have an apparent one, whereof God is the mediator. M. Leibnitz, unſatisfied with either of theſe hypotheſes, eſtabliſhes a third: a ſoul or ſpirit, he obſerves, is to have a certain ſeries of thoughts, deſires, and wills; a body, which is only a machine, is to have a certain ſeries of motions, to be determined by the combination of its mechanical diſpoſition, with the impreſſions of external objects.

If now there be found a ſoul and a body ſo framed, that the whole ſeries of wills of the ſoul, and the whole ſeries of motions of the body, exactly correſpond; and at the ſame time, for inſtance, when the ſoul deſires to go to any place, the two feet move mechanically that way: this ſoul and body will have a relation to one another; not by any actual union between them, but by the conſtant and perpetual correſpondence of the ſeveral actions of both. Now God puts together this ſoul and body, which had ſuch a correſpondence antecedent to their union. And the ſame is to be underſtood of all the other ſouls and bodies, that have been or ever will be joined.

In effect the laws of motion in the body, ſucceeding in the order of efficient cauſes, do all agree and correſpond with the ideas of the ſoul; ſo that the body is determined to act at the time when the ſoul wills. The ſame principle he extends further, and makes a pre-eſtabliſhed harmony between the kingdoms of nature and grace, to account for the apparent communication between them, and makes phyſical and moral evil correſpond. For a farther account of his manner of reaſoning upon this doctrine, we refer the reader to his Eſſais de Theodicée.

HARMOSTES, in grecian antiquity, an appellation given to ſeveral magiſtrates among the Spartans, whoſe buſineſs was to look to the building of citadels, the reparation of forts and fortifications, and the like.

HARNESS, the furniture put upon a horſe to draw in a coach, or other wheel-carriage.

HARNESS-GALLS, ſwellings or ſoreneſs on the breaſts of coach-horſes, occaſioned by the galling of the harneſs, eſpecially in rainy weather.

To cure this, firſt ſhave off the hair about the ſore very cloſe, and rub the whole breaſt with a lather of water and black-ſoap; then waſh that part of the breaſt which is uſually covered with the petrel, with ſalt water, ſuffering it to dry of itſelf. If the hardneſs of any part of the harneſs occaſions the galling, take it away, or cover it with little bolſters.

HARO, or **HAROL**, *clamor de haro*, in our old cuſtoms, an out-cry after felons, the original of which came from the Normans. See the article HUE and CRY.

HARP, a muſical inſtrument of the ſtring-kind, of a triangular figure, held upright between the legs of the perſon who plays upon it.

There is ſome diverſity in the ſtructure of harps. That called the triple harp, has three rows of ſtrings or chords, which in all make ſeventy-eight, or four octaves; the ſecond row makes the half-turn, and the third is uniſon with the firſt. There are two rows of pins on the right ſide, called buttons, that ſerve to keep the ſtrings tight in their holes, which is faſtened at the other end to three rows of pins on the upper ſide, called the keys. This inſtrument is ſtruck with the fingers and thumbs of both hands: its muſic is like that of the ſpinet, all its ſtrings going by ſemi-tones; whence ſome have called it the inverted ſpinet. There are among us two ſorts of this inſtrument, *viz.* the iriſh harp, which is ſtrung with wire; and the welch harp, ſtrung with gut.

King David is uſually painted with a harp in his hands; but we have no teſtimony in all antiquity, that the hebrew harp was any thing like ours: on a jewiſh medal of Simon Maccabæus, we ſee two ſorts of muſical inſtruments, but they are both of them different from our harp, having only three or four ſtrings. The harp in uſe among the antient Jews, is ſuppoſed to be more like a lute, or a guittar, than the inſtrument above deſcribed, which it is thought was invented either by the Cimbri, or the Anglo-ſaxons.

Bell-**HARP**, a muſical inſtrument of the ſtring-kind, thus called from the common players upon it, ſwinging it about as a bell on its biaſs.

It is about three feet long; its ſtrings, which are of no determinate number, are of braſs or ſteel-wire, fixed at one end, and ſtretched a-croſs the ſound-board, by ſcrews fixed at the other end. It takes in four octaves, according to the number of the ſtrings, which are ſtruck only with the thumbs, the right hand playing the freble, and the left the baſs; and in order to draw the ſound the clearer, the thumbs are armed with a little wire-pin. This may perhaps be the lyra or cythara of the antients; but we find no mention of it under the name it now bears, which muſt be allowed to be modern.

HARP-SHELL, in ichthyology, the elliptic, longitudinally coſtated dolium. See DOLIUM.

This is one of the moſt beautiful ſhells of this genus: it is about two inches and a half long, and a little more than an inch and a half in diameter; the clavicle has five volutions; the whole ſurface of the body of the ſhell is ornamented with large and elevated ribs, and the colour is a deep brown, variegated in a beautiful manner with a paler brown.

HARPEGGIATO, or HARPEGGIO, in muſic, is to cauſe the ſeveral ſounds of one accord to be heard diſtinctly one after the other, beginning with either at pleaſure, but commonly with the loweſt.

HARPIES, *harpyiæ*, ἁρπυιαι, among the antient poets, fabulous impure monſters, ſaid to be the daughters of Neptune and Earth. Virgil mentions three of them, Aello, Ocypete, and Celœno; they are deſcribed to be fowls with the face of a virgin, bear's ears, their bodies like vultures, and hands like their crooked talons. Virg. Æn. III.

HARPINEER, or HARPONEER, the perſon who manages the harping-iron. See the next article.

HARPING-IRON, or HARPOON, a large ſpear or javelin, made of forged iron, and five or ſix feet long; it is faſtened to a line, and uſed in the whale-fiſhery. See the article FISHERY.

HARPINGS, in a ſhip, properly denote her breadth at the bow. Some alſo give the ſame name to the ends of the bends that are faſtened into the ſtern.

HARPSICHORD, the moſt harmonious of all the muſical inſtruments of the ſtring-kind. It is played on after the manner of the organ, and is furniſhed with a ſet and ſometimes with two ſets of keys; the touching or ſtriking of theſe keys, move a kind of little jacks, which alſo move a double row of chords or ſtrings, of braſs or iron, ſtretched over four bridges on the table of the inſtrument.

HARQUEBUSS, a piece of fire arms, of the length of a muſquet, uſually cocked with a wheel. It carried a ball that weighed one ounce ſeven eighths.

There was alſo a larger ſort, called the great harquebuſs, uſed for the defence of ſtrong places, which carried a ball of about three ounces and a half: but they are now but little uſed, except in ſome old caſtles, and by the French in ſome of their garriſons.

HARRIER, a kind of hound, endowed with an admirable gift of ſmelling, and very bold in the purſuit of his game.

There are ſeveral kinds of harriers; ſome being for the hare, the fox, the wolf, hart, weaſel, badger, *&c.*

HARROW, in agriculture, an inſtrument uſed by huſbandmen, to break the clods of earth, and to draw the ground over the ſeed when ſown. It is a ſort of wooden drag, made in form of a ſquare, with large iron teeth, or tines, not unlike thoſe of a herſe. See HERSE.

HART, a ſtag, or male deer, in the ſixth year. See STAG and CERVUS.

HART-ROYAL, one that has been hunted by the king or queen, and eſcaped with life; in which caſe proclamation is uſually made, that none kill or offend him, as being a hart-royal proclaimed.

HART-HUNTING. See HUNTING.

HART'S HORNS, *cornua cervi*, in pharmacy, the whole horns of the common male deer, as ſeparated from the head, without farther preparation.

The chemical analyſis of hart's horn is ſufficiently known: it yields a water highly impregnated with a volatile ſalt, which is called ſpirit of hart's horn, with a fetid oil, and a volatile ſalt by the common diſtillation in a retort. The remainder in the bottom of the retort, after the diſtillation is finiſhed, is black; but on being calcined in an open fire, it becomes white and friable, and is what is kept in the ſhops under the name of burnt hart's horn. Beſide theſe preparations, we uſe the thin ſhavings of the horns, which, on long boiling in water, become a jelly: this jelly is nutritive and ſtrengthening; it is ſometimes given in diarrhœas; but a decoction of burnt hart's horn in water, is more frequently uſed for this purpoſe, and is what is called hart's horn drink.

The ſalt of hart's horn is a great ſudorific, and is given in fevers of many kinds with great ſucceſs; the ſpirit has the ſame and all the other virtues of volatile alkalis, and is uſed to bring people out of faintings by its pungency, on holding it under their noſe, and at the ſame time pouring ſome drops of it in water down the perſon's throat.

HART-WORT, *tordyllium*, in botany. See the article TORDYLLIUM.

Ethiopian HART-WORT, a plant more uſually called peucedanum, or hog's fennel.

HARTFORD, the capital of Hartfordſhire, ſituated twenty-one miles north of London: weſt long. 7′, and north lat. 51° 45′.

HARTFORD is alſo a town of New England, in the province of Connecticut, ſituated fifty miles weſt of Boſton: weſt long. 71° 15′, and north lat. 42°.

HARTLAND, a market-town of Devon, ſituated near the Briſtol-channel; it gives name to a cape, called Hartland-point, at the entrance of the Briſtol channel: weſt long. 4° 45′, and north lat. 51° 9′.

HARTLEPOOL, a port-town of the county of Durham, ſituated on the German ocean, fourteen miles ſouth-eaſt of Durham: weſt long. 55′, and north lat. 54° 40′.

HARVEST, the time or ſeaſon that the corn is ripe, and fit to be reaped and taken into barns.

HARVEST FLY, in zoology, a large four-winged fly, of the cicada-kind, very common in Italy, and erroneouſly ſuppoſed to be a graſshopper. See the article CICADA.

HARUSPEX, or ARUSPEX, in roman antiquity. See ARUSPICES.

HARWICH, a borough and port town of Eſſex, ſixty-two miles north-eaſt of London: eaſt long. 1° 25′, north lat. 52° 5′. It ſends two members to parliament.

HASEL, or HAZLE. See HAZLE.

HASLEM, an iſland of Denmark, in the Categate-ſea, north of the iſland of Zealand.

HASLEMERE, a borough-town of Surry, thirty-eight miles ſouth-weſt of London, and ten miles ſouth-weſt of Guildford.

It ſends two members to parliament.

HASSELT, a town of Weſtphalia, in Germany, fifteen miles north-weſt of Maeſtricht.

HASSIDEANS, or ASSIDEANS, an appellation given to thoſe Jews who reſorted to Mattathias, to fight for the law of God, and the liberties of their country.

HASSOCK, a baſs made of ruſhes, to kneel or reſt the feet upon in churches.

HASTA, among medaliſts, a kind of javelin, not ſhod or headed with iron; or rather an antient ſort of ſcepter, longer than ordinary, occaſionally given to all the gods.

HASTATED LEAF, among botaniſts, one reſembling the head of an halbert. See plate CXXVI. fig. 4.

HASTINGS, a borough-town of Suſſex, ſituated on the coaſt of the Engliſh channel, fifty miles ſouth-eaſt of London: eaſt longitude 36′, and north latitude 50° 50′.

HAT, a covering for the head, worn by the men in moſt parts of Europe. Thoſe moſt in eſteem are made of the pure hair of the caſtor or beaver; for they are alſo made of the hair or wool of divers other animals, and that by much the ſame proceſs.

Method of making HATS. To make the beaver-hats, they tear off the long and ſhort hair from the ſkin, with knives ſuitable to the occaſion. After which they proportion the quantity of the ſeveral ſorts of beaver hair, by mixing one third of the dry caſtor to two thirds of old coat, which is a term for a ſkin that has been worn ſome time by the Indians of America, who catch and ſell them to the Europeans. The hair, ſo mixed, is carded and weighed out into parcels, according to the ſize and thickneſs of the hat intended. The ſtuff is now laid on the hurdle, with an inſtrument called a bow, reſembling that of a violin, but larger; whoſe ſtring being worked with a ſmall bow-ſtick, and made to play on the furs, they fly, and mix themſelves together, the duſt and filth at the ſame time paſſing through the chinks. Inſtead of a bow, ſome hat-makers uſe a ſearce of hair, through which they paſs the ſtuff. Thus hats are formed of an oval figure, ending with an acute angle at the top: with what ſtuff remains they ſtrengthen them where ſlendereſt, yet deſignedly make them thicker in the brim near the crown, than towards the circumference, or in the crown itſelf. They next harden the ſtuff, ſo managed, into more compact flakes, by preſſing down a hardened leather upon it. This done, they are carried to the baſon, upon which laying one of the hardened hats they ſprinkle it over with water, and mould it; and the heat of the fire, with the water and preſſing, imbody the ſtuff into a ſlight hairy ſort of felt; after which, turning up the edges all round over the mould, they lay it by, and proceed with another, which being in like manner reduced to the ſame conſiſtence and form, they are both joined together, ſo as to make them meet in an angle at top, making only one conical cap. The next proceſs is to remove the hat to a trough, reſembling a mill hopper, which is a copper-kettle filled with water and grounds, kept hot for the purpoſe; and, after being dipped in the kettle, the hat is laid on the ſloping ſide, called the plank. Here they proceed to work it, by rolling and unrolling it again and again, one part after another, firſt with the hand, and afterwards with a ſmall wooden roller, taking care to dip it from time to time, till at length, by thus fulling and thickening it four or five hours, it is brought to the dimenſions intended. In this violent labour, the workmen uſually guard their hands with thick leather, which they call gloves. The hat thus wrought into the form of a conical cap, is reduced into proper ſhape on a block of the ſize of the intended crown, by tying it round with a ſtring, called a commander; after which, with a bent iron, called a ſtamper, they gradually beat down the commander all round, till it has reached the bottom of the block, and what remains at the bottom below the ſtrings forms the brim. In this ſtation it is ſet to dry, and afterwards ſinged, by holding it over the blaze of a fire, made of ſtraw, or ſhavings: it is then rubbed with pumice-ſtone, to take off the coarſer nap; then rubbed over with ſeal-ſkin, to lay the nap ſtill finer; and laſtly, carded with a fine card, to raiſe the fine cotton, with which the hat is to appear when finiſhed: then fitting it to the block, they tie it, cut round the edges, and deliver it to the dyers. See the article Dyeing.

The dye being compleated, the hat is dried by being hung in the roof of a ſtove heated with a charcoal-fire; and, when dry, it is ſtiffened with melted glue, or rather gum-ſenega, which is ſmeared over the hat with a bruſh, and rubbed in with the hand. Then, having ſpread a cloth over the ſteaming baſon, which is a little fireplace raiſed about three feet high, with an iron-plate laid over it, exactly covering the fire, the hat is laid upon the cloth, with the brim downwards, the cloth being firſt ſprinkled with water, to raiſe a ſtrong ſteam, to force in the ſtiffening. When it is moderately hot, the workmen ſtrikes gently on the brim, with the flat of his hand, to make the joinings incorporate and bind ſo as not to appear, turning it from time to time, and at laſt ſetting it on the crown. And when it has been ſufficiently ſteamed and dried, it is put again on the block, bruſhed, ironed, well ſmoothed, and fitted for lining.

Hats make a conſiderable article in commerce: England ſupplies Spain, Portugal, Italy, and Germany, with extraordinary quantities of them; and as our manufacturers have the reputation of making the beſt hats in Europe, their importation is prohibited.

Hats are alſo made for women's wear, of chips, ſtraw, or cane, by platting, and ſewing the plats together; beginning with the center of the crown, and working round till the whole is finiſhed. Hats for the ſame purpoſe are alſo wove and made of horſe-hair, ſilk, *&c.* Straw-hats knotted, pay on importation 1 s. $3\frac{40}{100}$d. the dozen, and draw back 1 s. $1\frac{50}{100}$d. Straw-hats plain, pay $3\frac{46\frac{1}{2}}{100}$d. the dozen, and draw back $3\frac{3\frac{3}{4}}{100}$d.

Hat-band, a band to tie or buckle round the crown of a hat, in order to let it out, or draw it cloſer to the head. Theſe are of ſeveral ſorts. They pay on importation 19 s. 3 d. the groſs, and draw back 16 s. $10\frac{50}{100}$d.

HATCHEL, or **Hitchel**, a tool with which flax and hemp are combed into fine hairs. It conſiſts of long iron-pins, or teeth, regularly ſet in a piece of board. See plate CXXVI. fig. 2.

There are ſeveral ſorts of hatchels, each finer than the other, with which flax and hemp are prepared for ſpinning. See the articles Flax and Hemp.

HATCHES, in a ſhip, a kind of trap-doors between the main-maſt and fore-maſt, through which all goods of bulk are let down into the hold.

Coamings of the **Hatches**, are the pieces of timber, or planks, which raiſe up the hatches, when they are made higher than the reſt of the deck.

Hatch-way, the place where the hatches are. Thus, to lay a thing in the hatch-way, is to put it ſo, that the hatches cannot be become at, or opened.

Hatches alſo denote flood-gates ſet in a river, *&c.* to ſtop the current of the water, particularly certain dams or mounds made of rubbiſh, clay, or earth, to prevent the water that iſſues from the ſtream-works and tin-waſhes in Cornwal, from running into the freſh rivers.

HATCHET, a ſmall light ſort of an ax, with a baſil-edge on its left ſide, and a ſhort handle, as being to be uſed with one hand.

Hatchets are uſed by various artificers, and more particularly in hewing of wood.

Hatchets and axes pay on importation 1 s. 3$\frac{40}{100}$d. the dozen, and draw back 1 s. 1$\frac{50}{100}$d. And for every 112 lb. of iron 4 s. 8$\frac{25}{100}$d. which is repaid on exportation.

HATCHING, the maturating fecundated eggs, whether by the incubation and warmth of the parent bird, or by artificial heat, ſo as to produce young chickens alive.

The art of hatching chickens by means of ovens has long been practiſed in Egypt; but it is there only known to the inhabitants of a ſingle village named Berme, and to thoſe that live at a ſmall diſtance from it. Towards the beginning of autumn they ſcatter themſelves all over the country, where each perſon among them is ready to undertake the management of an oven, each of which is of a different ſize, but in general they are capable of containing from forty to fourſcore thouſand eggs. The number of theſe ovens placed up and down the country is about three hundred and eighty-ſix, and they uſually keep them working for about ſix months: as therefore each brood takes up in an oven, as under a hen, only twenty-one days, it is eaſy in every one of them to hatch eight different broods of chickens. Every Bermean is under the obligation of delivering to the perſon who intruſts him with an oven, only two thirds of as many chickens as there have been eggs put under his care; and he is a gainer by this bargain, as more than two thirds of the eggs uſually produce chickens. In order to make a calculation of the number of chickens yearly ſo hatched in Egypt, it has been ſuppoſed that only two thirds of the eggs are hatched, and that each brood conſiſts of at leaſt thirty thouſand chickens; and thus it would appear that the ovens of Egypt give life yearly to at leaſt ninety-two millions ſix hundred and forty-thouſand of theſe animals.

This uſeful and advantageous method of hatching eggs has been lately diſcovered in France, by the ingenious Mr. Reaumur, who, by a number of experiments, has reduced the art to certain principles. He found by experience that the heat neceſſary for this purpoſe is nearly the ſame with that marked 32 on his thermometer, or that marked 96 on Farenheit's. This degree of heat is nearly that of the ſkin of the hen, and what is remarkable of the ſkin of all other domeſtic fowls, and probably of all other kinds of birds. The degree of heat which brings about the developement of the cygnet, the goſling, and the turkey-pout, is the ſame as that which fits for hatching the canary-ſongſter, and, in all probability, the ſmalleſt humming-bird: the difference is only in the time during which this heat ought to be communicated to the eggs of different birds: it will bring the canary bird to perfection in eleven or twelve days, while the turkey-pout will require twenty-ſeven or twenty-eight.

After many experiments, Mr. Reaumur found that ſtoves heated by means of a baker's oven, ſucceeded better than thoſe made hot by layers of dung: and the furnaces of glaſs-houſes and thoſe of the melters of metals, by means of pipes, to convey heat into a room, might, no doubt, be made to anſwer the ſame purpoſe. As to the form of the ſtoves, no great nicety is required: a chamber over an oven will do very well; nothing more will be neceſſary but to aſcertain the degree of heat, which may be done by melting a lump of butter, of the ſize of a walnut, with half as much tallow, and putting it into a phial; this will ſerve to indicate the heat with ſufficient exactneſs, for when it is too great, this mixture will become as liquid as oil, and when the heat is too ſmall, it will remain fixed in a lump; but it will flow like a thick ſyrup, upon inclining the bottle, if the ſtove be of a right temper: great attention therefore ſhould to be given to keep the heat always at this degree, by letting in freſh air, if it be too great, or ſhutting the ſtove more cloſe, if it be too ſmall; and that all the eggs in the ſtove may equally ſhare the irregularities of the heat, it will be neceſſary to ſhift them from the ſides to the center; thereby imitating the hens, who are frequently ſeen to make uſe of their bills, to puſh to the outer parts thoſe eggs that were neareſt to the middle of their neſts, and to bring into the middle ſuch as lay neareſt the ſides.

Mr. Reaumur has invented a ſort of low boxes, without bottoms, and lined with furs. Theſe, which he calls artificial-parents, not only ſhelter the chickens from the injuries of the air, but afford a kindly warmth, ſo that they preſently take the benefit of their ſhelter as readily as they would have done under the wings of a hen. After hatching, it will be neceſſary to keep the chickens, for ſome time, in a room artfully heated and furniſhed with theſe boxes; but afterwards they may be ſafely expoſed to the air in the court-yard, in which it may not be amiſs to place one of theſe artificial parents to ſhelter them if there ſhould be occaſion for it.

As to the manner of feeding the young brood, they are generally a whole day after being hatched, before they take any food at all; and then a few crumbs of bread may be given them for a day or two, after which they will begin to pick up inſects and graſs for themſelves.

But to ſave the trouble of attending them, capons may be taught to watch them in the ſame manner as hens do. Mr. Reaumur aſſures us that he has ſeen above two hundred chickens at once, all led about and defended only by three or four ſuch capons. Nay, cocks may be taught to perform the ſame office, which they, as well as the capons, will continue to do all their lives after.

Hatching, or **Haching**, in deſigning, *&c.* the making of lines with a pen, pencil, graver, or the like; and the interſecting or going acroſs thoſe lines with others drawn a contrary way, is called counter-hatching. The depths and ſhadows of draughts are uſually formed by hatching.

Hatching is of ſingular uſe in heraldry, to diſtinguiſh the ſeveral colours of a ſhield, without being illumined: thus, gules or red is hatched by lines drawn from the top to the bottom; azure, by lines drawn acroſs the ſhield; and ſo of other colours. See the articles Gules, Azure, *&c.*

HATCHMENT, in heraldry, a name ſometimes uſed for an atchievement, or eſcutcheon over a gate, door, or on the ſide of an houſe.

Hatchment, alſo ſignifies the marſhalling of ſeveral coats of arms in an eſcutcheon. See the article Marshalling.

HATFIELD, a market-town of Hartfordſhire, ſituated twenty miles north-weſt of London.

Hatfield-broadoak, or **King's Hatfield**, a market-town of Eſſex, twelve miles from Chelmsford, and twenty-eight from London.

HATHERLY, a market-town of Devonſhire, twenty miles north-weſt of Exeter.

HATTEM, a town of Gelderland, one of the United Provinces: eaſt longitude 6°, north latitude 52° 30′.

HATTOCK, a ſhock of corn containing twelve ſheaves: others make it only three ſheaves laid together.

HATUAN, a town of Upper Hungary, fifteen miles north-eaſt of Buda: eaſt long. 19° 35′, and north lat. 47° 48′.

HAVANNA, a port-town of the iſland of Cuba, in America, ſituated at the entrance of the gulph of Mexico; ſubject to Spain: weſt long. 84°, and north lat. 23°.

HAVANT, a market-town of Hampſhire, ſix miles north-eaſt of Portſmouth.

HAVEL, a river of Brandenburg, in Germany, which receives the river Spree, near Berlin, and diſcharges itſelf into the Elbe, a little below Havelburg.

HAVELBURG, a town of Germany, in the circle of Upper Saxony, and marquiſate of Brandenburg, ſubject to the king of Pruſſia: eaſt long. 12° 44′, and north lat. 53°.

HAVEN, a ſea port or harbour. See the article Harbour.

HAVER, a term uſed by country-people for oats.

HAVERFORD-WEST, a borough-town of Pembrokeſhire, in South Wales, ſituated twelve miles ſouth-eaſt of St. David's.

It ſends only one member to parliament.

HAVERIL, a market-town of Eſſex, twenty-four miles north of Chelmsford.

HAUGH, or **Haw**. See the article Haw.

HAUNCH, or **Hanch**, the hip, or that part of the body between the laſt ribs and the thigh. See the article Hip.

The haunches of a horſe are too long, if, when ſtanding in the ſtable, he limps with his hind legs farther back than he ought; and when the top or onſet of his tail is not in a perpendicular line to the tip of his hocks, as it always does in horſes whoſe haunches are of a juſt length.

There are ſome horſes, which, though they have too long haunches, yet commonly walk well: ſuch are good to climb hills, but are not at all ſure upon a deſcent, a deſcent, for they cannot ply their hams, and never gallop ſlowly, but always nearly upon a full ſpeed.

The art of riding the great-horſe has not a more neceſſary leſſon than that of putting a horſe upon his haunches, which in other words is called coupling him well, or putting him well together, or compact. A horſe that cannot bend or lower his haunches, throws himſelf too much upon his ſhoulder, and lies heavy upon the bridle.

HAUNT, among ſportſmen, the place to which game are accuſtomed to reſort: among hunters, it is the walk of a deer, or the place of his ordinary paſſage.

All kinds of large fowl that divide the foot, have their haunts by the ſides of ſhallow rivers, brooks, and plaſhes of water; they delight in boggy places and the dry parts of fens over-grown with ruſhes, reeds, and ſedges, in half drowned moors, and the hollow vales of downs and heaths, where there is ſhelter for them to lurk in obſcurity. Theſe do not appear in flocks, but they are the beſt flight for hawks that can be imagined.

The leſſer fowl, which are web-footed, continually haunt drowned fens, the main ſtream of rivers where the current is ſwifteſt, and all places where there is plenty of water, in which they may ſwim undiſturbed by man or beaſt; the wild-gooſe and barnacle excepted, who like no water above their ſounding, and ſeek none but ſhallow places. Theſe laſt are inconceivably delighted with green winter corn, and may always be ſound where it is ſown, eſpecially if the ends of the lands have much water about them.

The ſmaller fowl frequent ſmall brooks, rivers, ponds, drowned meadows, loughs or lakes, eſpecially if ſtored with unfrequented iſlands well furniſhed with ſhrubs, ruſhes, reeds, *&c.*

HAVRE, in geography, a french term ſignifying haven. Hence,

HAVRE DE GRACE is a port-town of France, in the province of Normandy, ſituated on the Engliſh channel, at the mouth of the river Seyne; eaſt long. 10′, and north lat. 49° 30′.

HAUTBOY, a muſical inſtrument of the wind kind, ſhaped much like the flute, only that it ſpreads and widens towards the bottom, and is ſounded through a reed. The treble is two feet long; the tenor goes a fifth lower, when blown open: it has only eight holes; but the baſs, which is five feet long, has eleven.

HAW, in botany, *&c.* a ſort of berry, the fruit of ſeveral ſpecies of meſpilus, thence denominated haw-thorns. See the article MESPILUS.

HAW, among farriers, an excreſcence reſembling a griſtle, growing under the nether eye-lid and eye of a horſe, which, if not timely removed, will put it quite out. It proceeds from groſs, tough, and phlegmatic humours, which falling from the head, and there uniting together, grow to this infirmity; the ſigns of which are the watering of the eye, and the involuntary opening of the under eye-lid.

Every farrier can cut it out; but ordinarily the horſe muſt be held faſt by the head, and a needle with a ſtrong double thread run through the middle of his upper eye-lid, which muſt be held open by the thread's being tied to his head: a needle and thread ſhould then be run through the haw, when cutting the ſkin round with a ſharp pen-knife, the haw may be plucked out. Then take the blood out of his eye, waſh it with beer or ale, and put in a good deal of ſalt; afterwards waſh it again, and ſtroking it down with your hand, let him go.

Sheep are cured of this malady by droping into the eye the juice of chamomile or crow's foot.

HAW-FINCH, in ornithology, the engliſh name of a bird, known among authors by the name coccothrauſtes.

HAWK, a ſynonymous term with falcon, though, by ſome, reſtrained to the leſſer ſort of falcons. See the articles FALCON and FALCONRY.

Others diſtinguiſh hawks into the long-winged and ſhort-winged kinds: of the firſt kind are the gentle-falcon, gerfalcon, lanner, ſaker, hobby, *&c.* See the article GERFALCON, *&c.*

And of the ſhort-winged kind are the goſhawk, ſparrow-hawk, ſtanyel, *&c.* See GOSHAWK, SPARROW-HAWK, *&c.*

Here it is to be obſerved, that the female hawks, as well as all other birds of prey, being larger and more robuſt than the males, are likewiſe more hardy, bold, and ſerviceable.

HAWKER, in commerce, a pedlar, or perſon that goes about the country ſelling wares: this name is ſaid to ariſe from their uncertain wandering, like perſons who with hawks ſeek their game where they may find it.

Every hawker, *&c.* muſt take a licence, for which he muſt pay 4 l. and if with horſe, aſs, or mule, for every one of them 4 l. a-piece: if he travels without, or contrary to his licence, he forfeits for every offence, to the informer and the poor of the pariſh where diſcovered, 12 l. If he travels with a forged licence, he forfeits 50 l. and if he refuſes to ſhew his licence 5 l.

The acts relating to hawkers do not extend to the makers of goods or their agents; to thoſe who ſell goods in fairs or markets; to the ſellers of fiſh, fruit, or other victuals; nor to the venders of acts of parliament, proclamations, forms of prayer, almanacs, books, and newspapers.

HAWKING, the exerciſe of taking wild-fowl by means of hawks.

The method of reclaiming, manning, and bringing up a hawk to this exerciſe, is called falconry. See FALCONRY.

As for the exerciſe itſelf, though at preſent much diſuſed, it furniſhes a great variety of terms ſtill retained in our language, as gleam, leaſh, pannel, quarry, train, ſeeling, *&c.*

When your hawk comes readily to the lure, a large pair of luring-bells are to be put upon her; and the more giddy-headed, and apt to rake out, your hawk is, the larger muſt the bells be. Having done this, and ſhe being ſharp-ſet, ride out in a fair morning, into ſome large field unencumbered with trees or wood, with your hawk on your fiſt; then having looſened her hood, whiſtle ſoftly to provoke her to fly, unhood her, and let her fly with her head into the wind, for by that means ſhe will be the better able to get upon the wing, and will naturally climb upwards, flying a circle. After ſhe has flown three or four turns, then lure her with your voice, caſting the lure about your head, having firſt tied a pullet to it; and if your falcon come in, and approach near you, caſt out the lure into the wind, and if ſhe ſtoop to it, reward her.

You will often find, that when ſhe flies from the fiſt, ſhe will take ſtand on the ground: this is a fault, which is very common with ſoar-falcons. To remedy this, fright her up with your wand; and when you have forced her to take a turn or two, take her down to the lure, and feed her. But if this does not do, then you muſt have in readineſs a duck ſealed, ſo that ſhe may ſee no way but backwards, and that will make her mount the higher. Hold this duck in your hand, by one of the wings near the body; then lure with the voice, to make the falcon turn her head, and when ſhe is at a reaſonable pitch, caſt your duck up juſt under her, when, if ſhe ſtrike, ſtoop, or truſs the duck, permit her to kill it, and reward her by giving her a reaſonable gorge. After you have practiſed this two or three times, your hawk will leave the ſtand, and delighted to be on the wing, will be very obedient.

It is not convenient, for the firſt or ſecond time, to ſhew your hawk large fowl; for it frequently happens, that they eſcape from the hawk, and ſhe not recovering them, rakes after them: this gives the falconer trouble, and frequently occaſions the loſs of the hawk. But if ſhe happens to purſue a fowl, and being unable to recover it, gives it over, and comes in again directly, then caſt out a ſealed duck, and if ſhe ſtoop and truſs it a-croſs the wings, permit her to take her pleaſure, rewarding her alſo with the heart, brains, tongue, and liver. But if you have not a quick duck, take her down with the dry lure, and let her plume a pullet and feed upon it. By this means a hawk will learn to give over a fowl that rakes out, and on hearing the falconer's lure, will make back again, and know the better how to hold in the head.

Some hawks have a diſdainful coyneſs, proceeding from their being high fed: ſuch a hawk muſt not be rewarded, tho' ſhe ſhould kill; but you may give her leave to plume a little, and then taking a ſheep's-heart cold, or the leg of a pullet, when the hawk is buſy in pluming, let either of them be conveyed into the body of the fowl, that it may ſavour of it; and when the hawk has eaten the heart, brains, and tongue of the fowl, take out what is incloſed, call her to your fiſt, and feed her with it: afterwards give her ſome of the feathers of the fowl's neck, to ſcower her, and make her caſt.

If your hawk be a ſtately high-flying one, ſhe ought not to take more than one flight in a morning; and if ſhe be made for the river, let her not fly more than twice: when ſhe is at the higheſt, take her down with your lure; and when ſhe has plumed and broken the fowl a little, feed her, by which means you will keep her a high-flyer, and fond of the lure.

HAWSER, in the ſea-language, a large rope, or a kind of ſmall cable, ſerving for various uſes a-board a ſhip, as to faſten the main and fore ſhrouds, to warp a ſhip a ſhip as ſhe lies at anchor, and wind her up to it by a capſtan, *&c.* The hawſer of a man of war may ſerve for a cable to the ſheat-anchor of a ſmall ſhip.

HAWSES, in a ſhip, are two large holes under the bow, through which the cables run when ſhe lies at anchor. Thus the hawſe-pieces are the large pieces of timber in which theſe holes are made. Hawſe-bags, are bags of canvaſs made tapering, and ſtuffed full of ocham; which are generally allowed ſmall ſhips, to prevent the ſhip from waſhing in at theſe holes: and hawſe-plugs, are plugs to ſtop the hawſes, to prevent the water from waſhing into the manger.

There are alſo ſome terms in the ſea-language that have an immediate relation to the hawſes. As *a bold hawſe*, is when the holes are high above the water. *Freſh the hawſe*, or veer out more cable, is uſed when part of the cable that lies in the hawſe is fretted or chafed, and it is ordered that more cable may be veered out, ſo that another part of it may reſt in the hawſes. *Freſh the hawſe*, that is, lay new pieces upon the cable in the hawſes, to preſerve it from fretting. *Burning in the hawſe*, is when the cables endure a violent ſtreſs. *Clearing the hawſes*, is diſentangling two cables that come through different hawſes. *To ride hawſe-full*, is when in ſtreſs of weather the ſhip falls with her head deep in the ſea, ſo that the water runs in at the hawſes.

HAY, any kind of graſs, cut and dried, for the food of cattle.

The time of mowing graſs for hay, muſt be regulated according to its growth and ripeneſs; nothing being more prejudicial to the crop than mowing it too ſoon, becauſe the ſap is not then fully come out of the root, and when made into hay, it ſhrinks away to nothing. It muſt not, however, be let ſtand too long, till it have ſhed its ſeeds. When the tops of the graſs look brown, and begin to bend down, and the red honey-ſuckle flowers begin to wither, you may conclude it ripe for mowing.

As ſoon as your graſs is mowen, if there is plenty of it, and it be thick in the ſwath, the hay-makers ſhould follow the mowers, and ſpread the ſwaths (unleſs you fear wet,) which is called tedding of them. At night, make it into cocks; and next day, as ſoon as the dew is off the ground, ſpread it again, and turn it, that it may dry on the other ſide. In this manner it is to be ſpread, turned, and made into cocks at night, till fully dry; and in caſe the weather ſeems to threaten rain, it ſhould be made into larger cocks, whereby it will be ſecured from wet, tho' let ſtand a day or two. Where thick-leaved weeds are among the graſs, it will require more drying and turning than ordinary.

Mowing of land too often is a great prejudice to it, unleſs conſtantly renewed by land-floods or manure; ſo that where theſe conveniencies cannot be had, the lands ſhould be fed once in two or three years; feeding being as neceſſary for hay ground, as fallowing is for corn-grounds.

Saint foin HAY, is of ſeveral ſorts, which may be diſtinguiſhed by the following terms, *viz.* 1ſt. The virgin. 2dly. The bloſſomed. 3dly. The full-grown. And, 4thly. The threſhed hay. The firſt of theſe is beyond compariſon the beſt. It muſt be cut before the bloſſoms generally appear; for when it ſtands till it is full blown, the moſt ſpirituous and nouriſhing parts of its juice are ſpent, the ſap is much impoveriſhed, and the ſaint-foin can never recover that richneſs it had in its virgin-ſtate. But this fine hay cannot well be had of uncultivated ſaint-foin, becauſe that may not be much above an handful high when it is in a condition to be cut; it would then make a very light crop, and would be a great while before it ſprang up again: but the rich will have two or three tuns to an acre, and ſpring again immediately for a ſecond crop; ſo that little or none in quantity would be loſt by ſo great an improvement of its quality.

The ſecond ſort is that cut in the flower, which, tho' much inferior to the virgin-hay, far exceeds any other kind as yet commonly propagated in England; and if it be a full crop, it may amount to three tuns an acre. This is that ſaint-foin which is commonly made, and the larger it is, the more nouriſhing it is for horſes.

The next ſort of ſaint-foin is the full grown, cut when the bloſſoms are gone, or going off: this alſo is good hay, tho' it falls ſhort by many degrees of the goodneſs of the other two ſorts: but it makes a greater crop than either of them, becauſe it grows to its full bulk, and ſhrinks little in drying.

The laſt ſort is the threſhed hay, which when not damaged by wet weather, has been found more nouriſhing to horſes than coarſe water-meadow hay; and, when it is cut ſmall by an engine, is good for cattle, and much better than the chaff of corn. The beſt time to cut it, is when the greateſt part of the ſeed is well filled; the firſt-blown ripe, and the laſt-blown beginning to be full.

The goodneſs of the hay depends greatly upon the manner of ordering it. The beſt hay in all England is made of ſaint-foin, without ever ſpreading it. This method, though it be longer before it be finiſhed, coſts leſs labour than the other. If ſaint-foin be laid up pretty green, it will take no damage, provided it be ſet in ſmall round ricks, with a large baſket drawn up in the middle of each, to have a vent-hole through which the ſuperfluous moiſture of the hay may tranſpire. As ſoon as its heating is over, theſe ricks ought to be thatched; and all ſaint-foin ricks, that are made when the hay is full dried in the cocks, ought to be thatched immediately after the making them. That which is laid up moſt dried, will come out of the rick of a green colour; but that which has been much heated in the rick, will be brown.

The ſeed affords the owner another opportunity of making a profit of his ſaint-foin: but this, if the hoeing huſbandry were general, would not be vendible in great quantities for planting; becauſe the ordinary crop of an acre, will produce ſeed enough to drill an hundred acres, which would not want planting for a long time. The other uſe then of this ſeed is for provender; and it has been affirmed by ſome, who have made trials of it, that three buſhels of good ſaint foin ſeed given to horſes, will nouriſh them as much as four buſhels of oats; and when well ordered, it is ſo ſweet, that moſt ſorts of cattle are greedy of it.

HAY, in geography, a market-town in Brecknockſhire, South Wales, thirteen miles north-eaſt of Brecknock.

HAY-BOTE, in law, a liberty to take thorns, and other woods, to make and repair hedges, gates, fences, &c. by a tenant for life or years.

HAY BOTE is alſo taken for wood for the making of rakes and forks, uſed in making hay.

HAYLESHAM, a market-town of Suſſex, ſituated ten miles eaſt of Lewes.

HAY-MARKET, a particular place in London, or its ſuburbs, where hay is ſold, and where all carts of hay that ſtand to be ſold there pay 3 d. per load towards paving the ſtreets. The new hay ſold in London, &c. between the firſt of June and the laſt of Auguſt, ought to weigh ſixty pounds a truſs; and old hay, the other part of the year, is to weigh fifty-ſix pounds, the ſeller being liable to forfeit 2 s. 6 d. for every truſs under that weight.

HAYN, a town of Sileſia, in the territory of Lignits, thirty five miles north-weſt of Breſlaw: eaſt longitude 16° 5′, north latitude 51° 17′.

HAYNAULT, a province of the Netherlands, bounded by Brabant and Flanders, on the north; by Namur and Liege, on the eaſt; by the Cambreſis, Picardy, and Champaign, on the ſouth; and by Artois, and another part of Flanders, on the weſt: the north part is ſubject to the houſe of Auſtria, and the ſouth part to France. Its capital is Mons.

HAYWARD, the perſon who keeps the common herd or cattle of a town.

He is appointed by the lord's court, and his office is to ſee that the cattle neither break nor crop the hedges of incloſed grounds; he is alſo to look to the fields, and impound cattle that commit treſpaſs therein.

HAZARD, a game on dice, without tables, is very properly ſo called, ſince it ſpeedily makes a man, or undoes him.

It is played with only two dice; and as many may play at it as can ſtand round the largeſt round table.

Two things are chiefly to be obſerved, *viz.* main and chance; the latter belonging to the caſter, and the former, or main, to the other gameſters. There can be no main thrown above nine, nor under five; ſo that five, ſix, ſeven, eight, and nine, are the only mains flung at hazard. Chances and nicks are from four to ten: thus four is a chance to nine, five to eight, ſix to ſeven, ſeven to ſix, eight to five; and nine and ten a chance to five, ſix, ſeven, and eight: in ſhort, four, five, ſix, ſeven, eight, nine, and ten, are chances to any main, if any of theſe nick it not. Now nicks are either when the chance is the ſame with the main, as five and five, or the like; or ſix and twelve, ſeven and eleven, eight and twelve. Here obſerve, that twelve is out to nine, ſeven, and five; eleven is out to nine, eight, ſix, and five; and ames-ace and duce-ace, are out to all mains whatever.

But to illuſtrate this game by a few examples:

amples: ſuppoſe the main to be ſeven, and the caſter throws five, which is his chance; he then throws again, and if five turn up, he wins all the money ſet him; but if ſeven is thrown, he muſt pay as much money as there is on the board: again, if ſeven be the main, and the caſter throws eleven, or a nick, he ſweeps away all the money on the table; but if he throws a chance, as in the firſt caſe, he muſt throw again: laſtly, if ſeven be the main, and the caſter throws ames-ace, duce-ace, or twelve, he is out; but if he throws from four to ten, he hath a chance; though they are accounted the worſt chances on the dice, as ſeven is reputed the beſt and eaſieſt main to be flung. Four and five are bad throws (the former of which being called by the tribe of nickers, little dick-fiſher) as having only two chances, *viz.* trey-ace and two duces, or trey duce and quater-ace: whereas ſeven hath three chances, *viz.* cinque duce, ſice-ace, and quater trey. Nine and ten are in the like condition with four and five; having only two chances. Six and eight have indeed the ſame number of chances with ſeven, *viz.* three; but experienced gameſters nevertheleſs prefer the ſeven, by reaſon of the difficulty to throw the doublets, two quaters, or two treys. It is alſo the opinion of moſt, that at the firſt throw, the caſter hath the worſt of it. On the whole, hazard is certainly one of the moſt bewitching and ruinous games played on the dice. Happy, therefore, the man who either never heard of it, or who has reſolution enough to leave it off in time. See the articles CHANCE and GAMING.

HAZLE, *corylus*, in botany. See the article CORYLUS.

Witch **HAZLE**, a name ſometimes given to the elm. See the article ELM.

HAZLE-EARTH, or **HAZLEY-EARTH**, in agriculture, a kind of red loam, which is ſaid to be an excellent mixture with other ſorts of earth; uniting what is too looſe, cooling what is too hot, and gently entertaining the moiſture.

The beſt manure for a hazley ſoil is marl, chalk, and ſea-coal aſhes. See MARL, CHALK, and ASHES.

HAZLE-HEN, a bird of the ſize of a moderately grown pullet; it is a ſpecies of tetrao, with a grey tail, ſpotted and faſciated with black, frequent in many parts of Europe. See TETRAO.

HEA, a province of the empire of Morocco, ſituated on the ocean, ſouth-weſt of Morocco proper.

HEAD, *caput*, in anatomy, the uppermoſt part of the body of an animal.

The head is the firſt of the five diviſions into which anatomiſts diſtinguiſh the human body, conſiſting of the head, neck, thorax, abdomen, and extremities. See the article NECK, *&c.*

The firſt parts to be diſtinguiſhed in the head, are the hairy part, or ſcalp; and the naked part, of the face; after which we are to attend to the diviſion into the ſinciput and occiput, the fore and hinder part of the head; the temples, the crown, or vertex; the bucca, the cheeks, and the philtrum, or lacuna.

The coverings of the head are, firſt, the hair; ſecondly, the ſkin; thirdly, the membrana celluloſa; and, fourthly, the muſcles. See HAIR, CUTIS, *&c.*

Beſides the external integuments of the head, there is an aponeurotic expanſion which covers the head like a cap, and is ſpread round the neck, and on the ſhoulders, like a riding-hood; and for this reaſon Winſlow gives it the name of coif, and calls the ſuperior portion of it the aponeurotic cap.

The head contains in the cavity of the bones of the ſkull the chief organ, or primum mobile of the whole animal oeconomy; the face is the ſeat of ſeveral other particular organs, which are greatly compounded. The proper containing parts of the head are the frontal muſcles, the pericranium, and the bones of the ſkull: the parts contained are the membranes of the brain, the brain itſelf, and the veſſels. See the article BRAIN.

With regard to the bones of the head, it may be obſerved, that the head expreſſes that part of the ſkeleton which is placed upon the top vertebra of the neck, and in this view is divided into the cranium or ſkull, and maxillæ. See the articles SKULL and MAXILLA.

The whole head of the ſkeleton is ſpheroidical, compoſed as it were of two ovals a little depreſſed on each ſide: one of them is ſuperior, the extremities pointing forward and backward; the other is anterior, the extremity being turned upwards and downwards, in ſuch a manner as that one extremity of each oval meets, and is loſt in the other, at the place particularly known by the name of the forehead.

This complex figure being viewed ſideways, repreſents a ſpheroidical triangle and we ought farther to obſerve, that the oval of the ſkull is broader behind than before, and that of the face broader above than below.

For the arteries and veins of the head, ſee the articles ARTERY and VEIN.

For the glands and muſcles, ſee the articles GLAND and MUSCLE.

Diſeaſes of the HEAD, are often miſtaken, even by phyſicians, for thoſe of other parts. Some phyſicians tell us, that thoſe who are ſubject to diſorders of the head, ought not to take any food at night.

HEAD-ACH, a moſt troubleſome ſenſation in the nervous membranes of the head, produced by various cauſes, and attended with different ſymptoms, according to its different degrees, and the place where it is ſeated.

The moſt common ſeat of this diſeaſe is the pericranium. It may likewiſe be in the ſkin that covers the ſkull, and in the dura mater: this laſt but ſeldom happens, but when it does it is very dangerous. There may likewiſe be a very acute pain in the thin membrane that covers the ſinus of the os frontis.

If the head-ach be ſlight, and affects a particular part of the head, it is called cephalalgia; if the whole, cephalæa; if one ſide only, hemicrania; if there is a fixed pain on the top of the head which may be covered with the end of the thumb, it is called clavus hyſtericus. The general cauſe of the head-ach, according to Hoffman, is a hindrance of the free circulation of the blood through the veſſels of the head.

When the blood ruſhes with impetuoſity, and in too great plenty into the membranes, which may happen to the plethoric, to thoſe whoſe uſual bleeding at the noſe is ſuppreſſed, and to young perſons, there is a pain in the whole head, which becomes hot, ſwells, achs, and looks red; the veſſels ſwell, and there is a ſtrong pulſation in thoſe of the neck and temples. The noſtrils are dry and parched; there is a burning heat, and drought in the fauces.

When the veſſels of the head are ſtuffed with a mucous ſerum from a ſtoppage of the running of the noſe, then there is a heavy obtuſe preſſing pain chiefly in the fore part of the head, in which there ſeems to be ſuch a weight, that the patient can ſcarce hold it up: ſometimes the ſkin is ſo ſwelled that it will pit; ſometimes it happens from the ſerous, ſharp, cauſtic matter of the french diſeaſe, which infeſts the pericranium, and often cauſes a caries in the ſkull: ſometimes it may proceed from matter of a ſaline, cauſtic nature, driven back from the external parts, as in the gout, itch, eryſipelas of the head, gutta roſacea, the ſmall-pox and meaſles, before the morbid matter is expelled to the outward ſkin, or, which is worſe, when it is driven back. In theſe caſes where a ſmall quantity of cauſtic matter cauſes the pain, it rather proceeds from a violent ſtricture of the membranes than from their diſtention.

There is likewiſe a moſt violent, fixed, conſtant, and almoſt intolerable head-ach, which brings on a debility both of body and mind, hinders ſleep, diſturbs digeſtion, deſtroys the appetite, cauſes a vertigo, dimneſs of ſight, blindneſs, a noiſe in the ears, convulſions, and the epilepſy; and by conſent of the other nervous parts of the body, produces vomiting, coſtiveneſs, coldneſs of the extreme parts, and the countenance of a dying perſon.

Sometimes the head-ach is ſymptomatic, and attends upon continual and intermitting fevers, and eſpecially the quartan, irregular flowing of the menſes, the hypochondriac paſſion, and the like. A hemicrania generally proceeds from a fault in the ſtomach from crudities or indigeſtion, and commonly appears when digeſtion is performed.

The curative indications are, 1. To divert the impetus of the blood and humours from the head, and to diſcuſs them by ſuitable remedies. 2. To relax the ſpaſtic ſtrictures of the membranes, the cauſe of which is a ſharp cauſtic matter, that the fluids may have a more free circulation. 3. To correct the peccant matter, and evacuate it gently through the moſt convenient emunctories. 4. To prevent a return by ſtrengthening the whole nervous ſyſtem, by proper remedies, and eſpecially by an accurate diet and regimen.

When the blood ruſhes to the head in too great quantity, bleeding is neceſſary, more particularly under the tongue, in the forehead, in the jugulars, or by leeches behind the ears. If the body abounds with too much blood, it will be beſt to bleed in the ancle firſt, and the next day, or a day after, in a vein about the head. But firſt of all cleanſe the body by an emollient clyſter, or by giving an infuſion of rhubarb and manna, with cream of tartar.

To reſtrain the orgaſm of the blood, it will be proper to give a diaphoretic and abſorbent mixture, with diaphoretic antimony, purified nitre, burnt hart's horn, and diacodium, diluted with a ſufficient quantity of ſuitable ſimple diſtilled waters. But if the head-ach proceeds from a copious vitiated ſerum ſtagnating in the membranes, either within or without the ſkull, with a dull heavy continual pain, which will neither yield to bleeding nor gentle laxatives, then more powerful remedies are required to diſſolve the thick glutinous humours, and to carry them off by ſtool.

Take of pure gum ammoniac, ſagapenum, the beſt myrrh, roſeated aloes, extract of black hellebore, reſin of jalap mercurius dulcis, and prepared cinnabar, each half a dram; of the extract of ſaffron, of the powder of caſtor, and of the ſalt of amber, each fifteen grains. Make them into a maſs; out of every ſcruple of which make twelve pills; ſix of which may be taken at night, and the other ſix in the morning. On the day the pills are taken, let the patient take nothing but thin broths. After three days they may be repeated again: when the vitiated ſerum has been ſufficiently evacuated, then give ſtrengthening remedies mixt with diuretics; at the ſame time the patient ſhould uſe exerciſe to make him ſweat, with ſtrong frictions, and ſuch aliment and liquors as tend to promote a diſcharge by urine. See DIURETICS.

If this method fails of ſucceſs, apply a bliſter made with an ounce of the emplaſtrum attrahens, and a dram of cantharides, adding a few grains of camphor. It may be of the ſize of a crown-piece, and applied to the nape of the neck; it ſhould be often renewed, and continued for a long time. When the diſeaſe is evident to the ſight and touch, from the ſerum ſtagnating under the ſkin of the head, a bliſter may be laid all over the head, with great advantage. See the article VESICATORY.

When there is any intenſe pain remaining fixed in one place lying pretty deep in the membranes, the herb ranunculus uſed as a veſicatory, has a wonderful efficacy: the leaves muſt be bruiſed in a marble mortar, and the part, if hairy, ſhaved; then a ſticking plaſter is to be laid on it, with a hole about the bigneſs of a ſilver-penny, and the leaves over that, juſt in the ſame manner as a cauſtic. See the article CAUSTIC.

If it is cauſed by a ſuppreſſion of a coryza, a ſmelling-bottle of volatile ſalts ſhould be held frequently to the noſe, or the patient may take herb ſnuff, with the addition of flowers of benjamin and powder of cloves. See CATARRH.

When the head-ach ariſes from a corrupted maſs of blood and an impure ſerum, as in the ſcurvy, and lues venerea, a decoction of the woods, with crude antimony, may be ſerviceable, after evacuations with the pills recommended above. Faſting a day now and then with labour and exerciſe, may be uſeful; as alſo a ſudorific. See the articles EXERCISE and SUDORIFIC.

A hemicrania, eſpecially a periodical one, is generally owing to a foulneſs in the ſtomach, and primæ viæ, for which gentle emetics will be beneficial; as alſo purgatives, to drive the humours from the head; afterwards ſtomachics. If it proceeds from profuſe evacuations of the menſes or hæmorrhoids, thoſe fluxes muſt be reduced within bounds. See the article FLUX, *&c.*

If the head-ach is ſo intolerable as to endanger the patient's life, or is attended with continual watching, fainting fits, a fever, an inflammation, or a delirium, recourſe muſt be immediately had to opiates, with native cinnabar, after a clyſter has been firſt given. When there is an intolerable pain in the ſinuſes of the noſe, or the boney ſinuſes of the head, produced by an extravaſation of ſome fluid, the only cure is ſcarification of the noſtrils, or cauſing the noſe to bleed with a ſtraw ſuddenly thruſt therein. See the article EXTRAVASATION.

If there is an extravaſation under the pericranium, and the humour is ſo ſharp as to begin to render the bone carious, then recourſe muſt be had to inciſion, as in a whitlow. See WHITLOW.

If the head-ach ariſes from a ſudden orgaſm in the blood, proceeding from heat, exerciſe, or labour, evacuations of any kind are not proper, but rather cooling draughts with nitre.

HEAD-MOULD-SHOT, a diſorder affecting new-born infants, in which the edges of the bones of the cranium at the ſutures, eſpecially the coronal one, lie over one another, ſo that the fibres of the meninges are ſtretched, and torn aſunder, and the brain itſelf compreſſed; whence convulſions frequently happen that carry them off.

The head-mould-ſhot is a diſorder oppoſite to the horſe-ſhoe-head. See the article HORSE SHOE-HEAD.

Ulcers and eruptions of the **HEAD.** There are ſeveral ulcers or eruptions, which the hairy part of the head is ſubject to, and which the writers in medicine have diſtinguiſhed by the ſeveral names of tineæ, favi, and achores, for the treatment and account of which, ſee the articles ACHOR and TINEA.

When the achor extends itſelf to the face, it is known by the name of cruſta lactea. See CRUSTA LACTEA.

For the wounds of the **HEAD.** See the articles WOUND, FISSURE, CONTRA-FISSURE, FRACTURE, TREPAN, &c. Mr. le Dran, in his obſervations on the wounds of the head, ſhews how much more dangerous the caſe is, when the cranium does not break by violent blows, &c. than when it is fractured, becauſe of the greater commotions of the brain, &c. and therefore concludes it neceſſary to perform the operation of the trepan oftener than is commonly practiſed.

HEAD is alſo uſed for the top or extremity of any thing; thus we ſay the head of a tree, the head of a bone, the head of a muſcle, the head of a nail, &c.

HEAD, in architecture, an ornament of carved work, or ſculpture, frequently ſerving as the key of an arch, or platband, on other occaſions.

Theſe ſort of heads uſually repreſent ſome of the heathen divinities, virtues, ſeaſons, ages, &c. with their attributes, as a thunderbolt for Jupiter, a diadem for Juno, a trident for Neptune, a crown of ears of corn for Ceres, a helmet for Mars, a caduceus for Mercury, &c.

The heads of beaſts are alſo uſed in places ſuitable, as an horſe's head for an equery; a deer's or boar's head, for a park or foreſt; a dog's head for a kennel; a bullock's or ſheep's, for a ſhambles or market houſe. In the metopes, friezes and other parts of certain antique doric temples, we ſee repreſentations of bullocks, or rams-heads, as a ſymbol of the ſacrifices offered there.

HEAD, in heraldry. The heads of men, beaſts, or birds, are very frequent in armoury, and borne either full-faced, looking forward, or ſide-faced in profile, when only one half of the face appears, which differences ought to be mentioned in blazoning, to avoid miſtakes; as a head, or heads fronting; or a head, or heads ſide faced, or in profile: thus, Vert, a chevron gules, between three turks-heads couped ſide-faced proper, is borne by the name of Smith. And again, Or, a croſs gules, between four blackmoors heads, couped at the ſhoulders proper, is borne by the name Juxon. As the head is the principal part of the body, ſo it is of courſe the nobleſt bearing.

Among medaliſts, the different heads on antient coins, are diſtinguiſhed by the different dreſſes thereof. See MEDAL.

In the imperial medals, where the head is quite bare, it is uſually a ſign the perſon was not an emperor, but one of the children of an emperor, the preſumptive heir of the empire. The heads which are covered, are either covered with a diadem, or a crown, or a ſimple caſk, or a veil, with ſome other foreign covering; whereof the diadem is the moſt antient. The heads of deities are diſtinguiſhed by ſome ſpecial ſymbol thereof.

HEAD, among huntſmen, is uſed for the horns of a deer, as a hart, buck, &c. See ANTLER, CROCHES, &c.

HEAD, in the manege. Head of a horſe imports the action of his neck, and the effect of the bridle, and the wriſt: this horſe plants his head well, and obeys the hand; ſuch a horſe refuſes to place his head; he ſhoots out his noſe, and never reſts right on the hand, &c. For the properties of the head of a horſe. See HORSE.

HEAD *in and likewiſe the hips*. You muſt paſſage your horſe-head and croupe in, *i. e.* work him ſide-ways upon two parallel lines, at ſtep or trot, ſo that when the horſe makes a volt, his ſhoulders mark a piſte, or trade at the ſame time, that his haunches give the tract of another, and the horſe plying or bending his neck, turns his head a little within the volt, and ſo looks upon the ground he is to go over.

HEAD, in the military art. Head of a work is the front of it next the enemy, and fartheſt from the place, as the front of a hornwork is the diſtance between the flanked angles of the demibaſtions; the head of a double tenaille is the ſalliant angle in the middle; and the two other ſides which form the re-entering angles. See the article FRONT, &c.

HEAD, in painting, ſculpture, &c. a repreſentation of that part of the human body, whether in colours, draughts, or creux: if taken from the life, or ſuppoſed to bear a juſt reſemblance to the perſon, it is more properly called portrait. See the article PORTRAIT.

HEAD BOROW, the perſon who is chief of the frank-pledge in boroughs, or who antiently had the government within his own pledge. See FRANK-PLEDGE.

HEAD BOROWS, at this time, are a kind of conſtables. See CONSTABLE.

HEAD-FARCIN. See the article FARCIN.

HEAD-LAND, in huſbandry, is taken to ſignify the upper part of land left for the turning of the plough.

HEAD-LINES, in a ſhip, thoſe ropes of all ſails which are next to the yards, and by which the ſails are made faſt to the yard. See SAIL and YARD.

HEAD-PENCE, a certain ſum antiently collected by the ſheriff of Northumberland, of the inhabitants of that county, without any account to be given thereof to the king. which exaction was aboliſhed by Hen. VI.

HEAD-SEA, is when a great wave or billow of the ſea comes right a-head of the ſhip, as ſhe is in her courſe.

HEAD-SAILS, in a ſhip, thoſe which belong to the fore-maſt, and boltſprit: for it is by theſe that the head of the ſhip is governed, and made to fall off and keep out of the wind; and theſe in quarter-winds are the chief drawing ſails.

HEAD-SILVER, a fine paid to the lords of the leet.

HEAD STALL, in the manege. See the article CAVEZON.

HEAD-STALL, among muſicians. See the article PHORBÆA.

HEAD-TIN, in metallurgy, a preparation of tin-ore towards the fitting it for working into metal. When the ore has been pounded and twice waſhed, that part of it which lies uppermoſt, or makes the ſurface of the maſs in the tub, is called head-tin: this is ſeparated from the reſt, and after a little more waſhing becomes fit for the blowing-houſe.

HEAD *of a ſhip*, or other veſſel, is the prow, or that part which goes foremoſt.

Moor's **HEAD** is underſtood of a horſe with a black head and feet; the body being uſually of a roan colour. Among engineers a moor's head is uſed for a kind of bomb or granado ſhot out of a cannon. Among chemiſts it is a cover, or capital, of an alembic; having a long neck to convey the vapours raiſed by the fire into a veſſel, which ſerves as a refrigeratory. See ALEMBIC.

Dragon's **HEAD**, in aſtronomy, &c. is the aſcending node of the moon, or other planet. See the article NODE.

HEADS, a term uſed by builders for that kind of tyle which they uſe to lay at the eaves of a houſe; being the full breadth of a common tyle, and but half a tyle in length. See the article TYLE.

HEADFORD, a town of Galway, in Ireland, twelves miles north of the city of Galway.

HEALING, is uſed, by ſurgeons, for the curing of wounds, ulcers, and other ſores. See the articles WOUND, ULCER; TUMOUR, &c.

HEALING, in architecture, the covering a roof with lead, tyles, ſlate, or the like.

HEALTH, is a right diſpoſition of the body, and of all its parts; conſiſting in a due temperature, a right conformation, juſt connection, and ready and free exerciſe of the ſeveral vital functions.

Health admits of latitude, as not being the ſame in all ſubjects, who may yet be ſaid to enjoy health.

That part of medicine, which ſhews the means of preſerving health, is termed hygieine. See the article HYGIEINE.

The Greeks and Romans deified health, repreſenting it under the figure of a woman, whom they ſuppoſed to be the daughter of Æſculapius. We find the name of the goddeſs Salus, or health, on many medals of the roman emperors, with different inſcriptions, as SALUS PUBLICA, SALUS REIPUBLICÆ, SALUS AUGUSTI, &c.

HEAM, in beaſts, is the ſame with the ſecundines, or after-birth in women.

The medicines proper to expel it, are thyme, winter-ſavoury, and penny-royal, boiled in white wine and given inwardly; as alſo common hore-hound ſtewed in white wine. Dittany, put up in form of a peſſary, drives out a dead foal, and brings away the ſecundines. Angelica produces the ſame effect; ſo does parſley-ſeed, alexanders, hops, fennel, ſavin, and bay-berries.

HEAN, a town of Tonquin, in the farther India, ſituated on the river Domea, eighty miles north of the bay of Tonquin: eaſt long 107°, north lat. 22°.

HEARING, *auditus*, the ſenſe whereby we perceive ſounds. See SOUND.

The organ of hearing is the ear, and particularly the auditory nerve and membrane. See the article EAR.

This membrane, in the various degrees of tenſion and relaxation, adapts itſelf to the ſeveral natures and ſtates of ſonorous bodies; becoming tenſe for the reception of acute ſounds, and relaxed for the admiſſion of grave ſounds. In ſhort, it is rendered tenſe and relaxed in a thouſand different degrees, according to the various degrees of acuteneſs or gravity in ſounds.

Sound, then, is in effect nothing but a certain modulation of the air, which being collected by the external ear, paſſes thro' the meatus auditorius, and beats upon the membrane of the tympanum, which moves the bones in the tympanum: theſe move the internal air, which finally communicates the motion to the auditory nerve, in the labyrinth and cochlea; and according as the vibrations are quick or ſlow, the ſound is either acute or grave.

The curious ſtructure of the labyrinth and cochlea, ſerves to make the weakeſt ſounds audible; for the whole organ of hearing being included in a ſmall ſpace, the impreſſion would have been made only on a very ſmall part of it, had the auditory nerve run in a ſtraight line; and the ſtrength of the impreſſion being, cæteris paribus, always as the number of parts upon which the impreſſion is made, thoſe ſounds which are now low, could not have been heard at all. If, like the retina, the auditory nerve had been expanded into a large web, that had covered or lined ſome wide cavity, even in this caſe the impreſſion of ſounds had been much weaker than they are now: for this large cavity would have given room for the ſounds to dilate, and all ſounds grow weaker in proportion as they dilate: but in the preſent ſtructure of the labyrinth and cochlea, both theſe inconveniencies are prevented; the canals of which, by their winding, contain large portions of the auditory nerve; upon every point of which, the ſmalleſt ſound being once impreſt, becomes audible; the ſounds are hindered from dilating, by their narrowneſs; and the impreſſions that are made upon the nerves, by the firſt dilatation, are ever the ſtrongeſt. In like manner, the ſtrength of the impreſſion is increaſed in the narrow canals, by means of the elaſticity of the ſides of the bony canal; which receiving the firſt and ſtrongeſt impulſes of the air, reverberate them the more ſtrongly upon the auditory nerve.

It deſerves obſervation that though the air be the uſual matter of ſounds; ſo that if a bell be hung in vacuo, it will not be heard at all; yet moſt other bodies, properly diſpoſed, will do its office, only ſome more faintly than others. Thus a ſound may be heard through water, or even through earth, of which there are various inſtances.

As the ſight is aſſiſted by ſpectacles, or other glaſſes, ſo the hearing is enlivened and rendered quick, by means of acouſtic inſtruments; which are of various figures, but for the moſt part bear ſome reſemblance to a trumpet, diverging and growing wider towards the external mouth, marked B B, (plate CXXVI. fig. 3. nº 1.) the ſlender part A being introduced into the ear. But beſides this common kind, thoſe repreſented *ibid.* nº 2 and 3, are highly commended; but eſpecially the third one, which by reaſon of its ſmallneſs, and form, being wreathed up like a ſpiral ſhell, may be ſo concealed under one's hair or wig, as ſcarce to be obſervable; whilſt the ſlender part A is introduced into the ear, and the cords B B tied round it.

However, it is to be obſerved, that the ſimple kind almoſt in the ſhape of a horn, (*ibid.* nº 1.) and made either of braſs, ſilver, &c. is the beſt inſtrument hitherto invented for aſſiſting the hearing.

Dulneſs of HEARING. See the articles DEAFNESS and EAR.

Some recommend the following medicine for dulneſs of hearing: Take eſſence of amber, a dram; caſtor and oil of chamæmile, of each half a ſcruple; and oil of amber, one drop: mix them all together, and three or four times a day put a piece of cotton wetted in the mixture, into the ear.

The drinking of mineral waters every ſpring in a regular manner, is alſo recommended as a preſervative from this diſorder.

HEARSE, among ſportſmen, a hind of the ſecond year of her age. See HIND.

HEART, *cor*, in anatomy, a muſcular body, included in the pericardium, and ſituated nearly in the middle of the breaſt, between the lobes of the lungs; being the primary organ of the circulation of the blood, and conſequently of life.

Its figure is nearly conic, the larger end being called its baſe, and the ſmaller end its apex. Its lower part is plane, and the upper part convex. Its ſituation is nearly tranſverſe, or horizontal; ſo that its baſe is in the right, and its apex, with the greateſt part of its bulk, is in the left ſide of the thorax; and conſe-

quently,

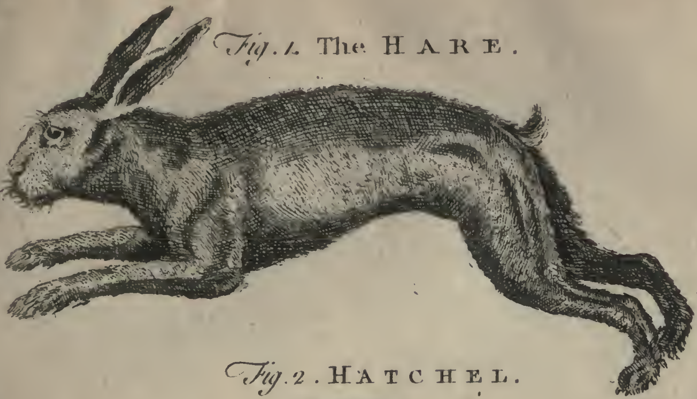


Fig. 1. The HARE.

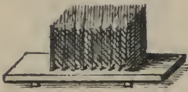


Fig. 2. HATCHEL.

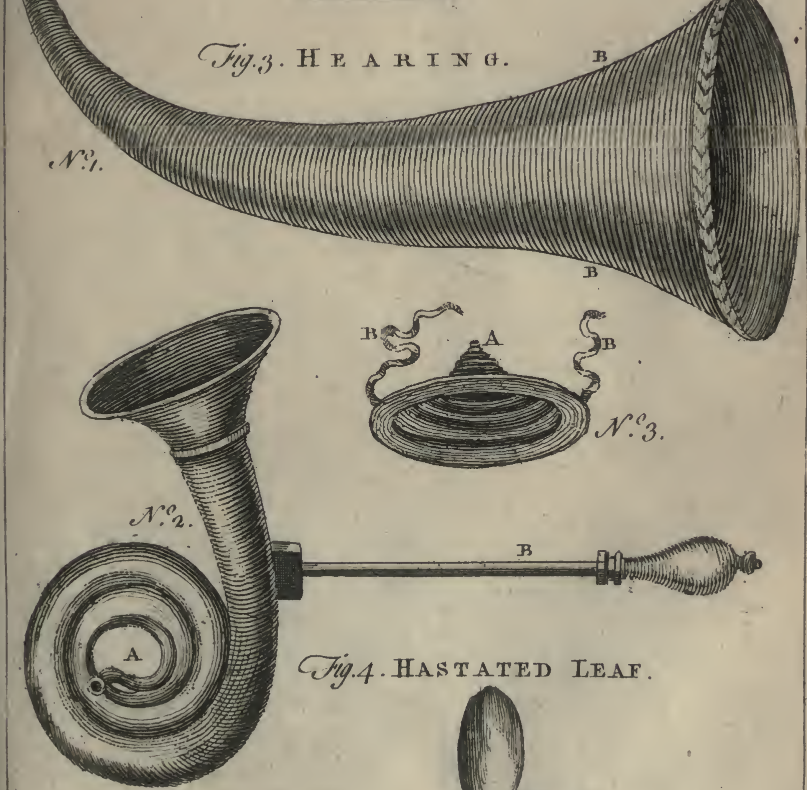


Fig. 3. HEARING.

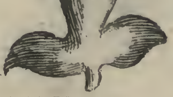


Fig. 4. HASTATED LEAF.

J. Jefferys sculp

quently, it is there that the pulſation is felt.

The plane ſurface of the heart lies on the diaphragm; the convex one is turned upwards. The heart is connected, 1ſt, by the intervention of the pericardium with the mediaſtinum, and with a large part of the middle of the diaphragm: this is contrived by nature, to prevent its being diſplaced, inverted, or turned too rudely about, in conſequence of the various motions of the body. 2. Its baſe is connected to its common veſſels; but its apex is free, and is received into a kind of cavity in the left lobe of the lungs.

The length of the human heart is about ſix fingers breadth: its breadth at the baſe, is about five fingers; and its circumference about thirteen. It is, both externally and internally, ſurrounded with a ſmooth membrane. There is a quantity of fat about it, which covers its baſe and its apex, and ſerves for lubricating it, and for facilitating its motions. Its blood-veſſels are of two kinds, common and proper; its common or peculiar veſſels being the coronary arteries and veins.

The common veſſels of the heart are two veins, called the vena cava, and the vena pulmonalis; and two arteries, the pulmonary one, and aorta. The nerves of the heart are ſmall, and ariſe from the par vagum and intercoſtals. The auricles are two. See VEIN, ARTERY, &c.

There are alſo two cavities in the heart, called its ventricles: of theſe the right is thinner and weaker in its circumference, but uſually much more capacious than the left: it receives the blood from the vena cava, and the right auricle, and delivers it into the pulmonary artery, to be carried to the lungs. The left ventricle is much ſtronger and thicker in its ſides; but it is narrower and ſmaller than the right: it receives the blood from the pulmonary vein, and the left auricle, and extrudes it very forcibly into the aorta. The right ventricle is in the anterior part of the thorax; the left in the hinder part: ſo that they might be called the anterior and poſterior ventricles, much more properly than the right and left. See CIRCULATION.

There are in the ſides of both the ventricles of the heart, and of both its auricles, ſeveral columnæ carneæ, or lacertuli, with furrows between them, ſeeming ſo many ſmall and diſtinct muſcles; and from the concourſe of the tendinous fibres of theſe in the heart, there are formed peculiar membranes ſituated at the orifices of the auricles of the heart: and there are alſo other columns of this kind, which run tranſverſely from one ſide of the ventricles to the other: theſe ſerve partly to aſſiſt the contraction of the heart in its ſyſtole, and partly to prevent its too great dilatation in its diaſtole. See the articles SYSTOLE and DIASTOLE.

The valvulæ of the heart are of three kinds. 1. The tricuſpidales: theſe are three in number, and are ſituated at the ingreſs of the vena cava in the right ventricle. 2. The mitrales: theſe are two, and are ſituated in the left ventricle at the ingreſs of the pulmonary vein: theſe ſerve to hinder the ingreſs of the blood from the heart into the veins again, while they are conſtricted. 3. The ſemilunar ones: theſe are three, and are ſituated at the origin of the aorta and pulmonary artery, and ſerve to prevent the reflux of the blood from them into the heart: theſe, for the ſake of ſtrength, are furniſhed with a number of fleſhy fibres and ſpheroide corpuſcles.

The orifices of the veins of Thebeſius and Verheyen, in the hollows of the heart, are for carrying back the blood from the ſubſtance of the heart to its cavities.

The fibres of the heart are of a muſcular ſubſtance, and of a moſt amazing fabric. They are of two kinds, 1. Straight ones, in the left ventricle; and, 2. Spiral ones, common to both ventricles, and of two orders. The exterior ones run to the left, from the baſe of the heart: the interior ones run to the right, and interſect the others; and when they act, they cloſely conſtringe the cavities of the heart, and drive out the blood from them. According to this fabric, the heart may be reſolved into two muſcles, each of which conſtitutes one of its ventricles.

The uſe of the heart, is for the circulation of the blood. It receives the blood from the veins, running from all parts of the body; and propels it again, by its own motion, to all theſe parts through the arteries. On this depend life itſelf, the preſervation of the frame, and the motions and actions of all its parts. See the article CIRCULATION *of the blood.*

This motion of the heart is wonderful: it continues to the utmoſt period of life, day and night, without a ſingle moment's interruption or intermiſſion; and is performed more than an hundred thouſand times every day. Here is, indeed, ſomething like what the mechaniſts want, under the name of a perpetual motion; and the ſtupendous wiſdom of the Creator is, in nothing, expreſſed more glorioully.

But that the reader may have as diſtinct an idea as poſſible of this primary organ of life, we ſhall lay before him ſeveral views of it. That exhibited in plate CXXVII. n° 1, repreſents the human heart ſeen in its convex part, and in its natural ſituation; where B marks the branches of the coronary vein; C, the coronary artery; D, the right auricle; E, branches of veins going from the right auricle; G, the trunk of the aorta; H, the trunk of the pulmonary artery; I, the aſcending trunk of the vena cava; K, the deſcending trunk of the vena cava; L, L, *&c.* branches of the aorta, riſing upwards; M, one of the branches of the pulmonary artery; N, N, *&c.* branches of the pulmonary vein. N° 2. *ibid.* repreſents the heart opened, to ſhew the ſtructure and form of its ventricles; where A expreſſes the muſcular ſeptum, or partition, which divides the ventricles; B, the right ventricle opening into the right auricle, and into the trunk of the pulmonary artery; C, the left ventricle, opening into the left auricle, and into the great trunk of the aorta. N° 3 and n° 4, *ibid.* repreſent the heart in different poſitions; where A marks the aſcending trunk of the vena cava; B the trunk of the aorta, C branches of the pulmonary vein, D the deſcending trunk of the vena cava, and E part of the right auricle, cut away to ſhew the different arrangement of the internal fibres and venous ducts.

Force of the HEART. Several ingenious perſons have, from time to time, attempted to make eſtimates of the force of the blood in the heart and arteries; who have as widely differed from each other, as they have from the truth, for want of a ſufficient number of data to argue from. This ſet the truly ingenious Dr. Hales upon making proper experiments, in order to aſcertain the force of the blood in the veins and arteries of ſeveral animals.

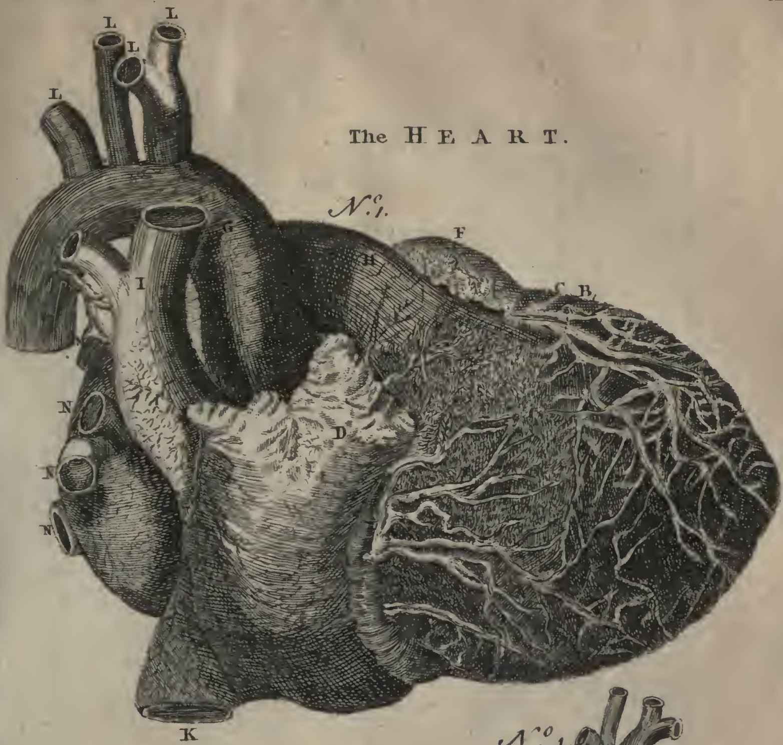
If, according to Dr. Keil's eſtimate, the left ventricle of a man's heart throw out in each ſyſtole an ounce, or 1.638 cubic inch of blood, and the area of the orifice of the aorta be $= 0.4187$; then dividing the former by this, the quotient 3.9 is the length of the cylinder of blood, which is formed in paſſing thro' the aorta in each ſyſtole of the ventricle; and in the ſeventy-five pulſes of a minute, a cylinder of 292.5 inches in length will paſs: this is at the rate of 1462 feet in an hour. But the ſyſtole of the heart being performed in one third of this time, the velocity of the blood in that inſtant will be thrice as much, *viz.* at the rate of 4386 feet in an hour, or 73 feet in a minute. And if the ventricle throws out one ounce in a pulſe; then in the ſeventy-five pulſes of a minute, the quantity of blood will be equal to 4.4 lb. 11 oz. and in thirty-four minutes a quantity equal to a middle-ſized man, *viz.* 158 lb. will paſs through the heart. But if, with Dr. Harvey, and Dr. Lower, we ſuppoſe two ounces of blood, that is, 3.276 cubic inches, to be thrown out at each ſyſtole of the ventricle, then the velocity of the blood in entering the orifice of the aorta, will be double the former, *viz.* at the rate of 146 feet in a minute, and a quantity of blood equal to the weight of a man's body will paſs in half the time, *viz.* 17 minutes.

If we ſuppoſe, what is probable, that the blood would riſe $7 + \frac{1}{2}$ feet high in a tube fixed to the carotide artery of a man, and that the inward area of the left ventricle of his heart, is equal to fifteen ſquare inches; theſe multiplied into $7 + \frac{1}{2}$ feet give 1350 cubic inches of blood, which preſſes on that ventricle, when firſt it begins to contract, a weight equal to 51.5 pounds.

What the doctor thus calculates, from ſuppoſition, with regard to mankind, he actually experimented upon horſes, dogs, fallow does, *&c.* by fixing tubes, in orifices opened in their veins and arteries; by obſerving the ſeveral heights, to which the blood roſe in theſe tubes, as they lay on the ground; and by meaſuring the capacities of the ventricles of the heart, and orifices of the arteries. And that the reader may the more readily compare the ſaid eſtimates together, he has given a table of them, ranged in the following order.

The HEART.

N.º 1.



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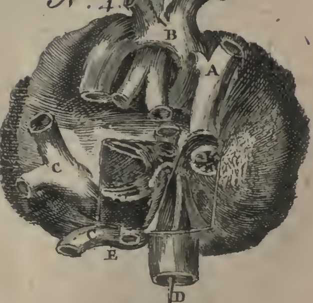
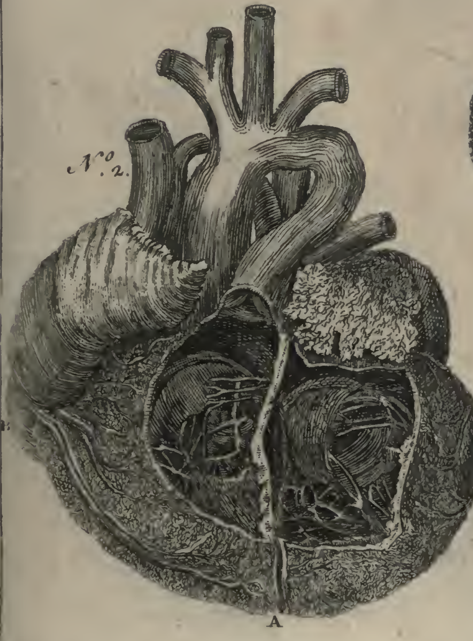
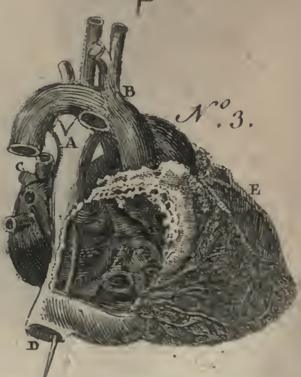


N.º 2.



N.º 3.



T. Jefferys sculp

The ſeveral animals.	Weight of each. Pounds. Ounces.	Height of the blood in the tube from the jugular vein. Inches.	Height of the blood in tubes fixed to arteries. Feet. Inches.	Capacity of the left ventricle of the heart. Cubic inches.	Area of the orifice of the aorta. Square inches.	Velocity of the blood in the aorta. Feet and inches in a minute.	Quantities of blood equal to the wt. of the animal in what time. Minutes.	How much in a minute. Pounds.	Weight of the blood ſuſtained by the left ventricle contracting. Pounds.	N° of pulſes in a min.	Area of tranſv. ſection of deſcending aorta. Square inches.	Area of the tranſverſe ſection of aſcending aorta. Square inches.
Man	160	On ſtraining.	7 6	1.659	0.4187	56.55	34.18	4.38	51.5	75		
				3.318		113.3	17 6	9.36				
Horſe 1ſt.			8 3									
2d.			9 8									
3d.	825	12 52	9 6	10	1.036	86.85	60	13.75	113.22	36	0.677	0.369
Ox	1600			12.5	1.539	76.95	88	18.14		38	0.912	0.85
												right. left
Sheep	91	5½ 9	6 5½	1.85	0.172	174.5	20	4.593	36.56	65	0.094	0.07 0.012
Doe			4 2	9	0.476						0.383	0.246
												right. left
Dogs 1ſt.	52	0 6	6 8	1.172	0.196	144.77	11.9	4.34	33.61	97	0.106	0.041 0.034
2d.	24	5 7	2 8	1	0.185	130.9	6.48	3.7			0.102	0.031 0.009
3d.	18	5	4 8	0.633	0.118	130	7.8	2.3	19.8		0.07	0.022 0.009
4th.	12 8	4	3 3	0.5	0.101	120	6.7	1.85	11.1		0.061	0.015 0.007

Dr. Jurin likewiſe deduces the force of the heart from the laws of hydraulics, in the following manner. He ſuppoſes $p=$ to the weight of the left ventricle, or a quantity of blood equal to the ſame weight; $S=$ the internal ſurface of the ſame; $l=$ the mean length of the filaments of blood iſſuing from the ſame; $s=$ the ſection of the aorta; $q=$ the quantity of blood contained in the left ventricle; $t=$ the time in which the blood would be expelled from the heart, taking away the reſiſtance of the arteries, and of the blood going before; $v=$ the variable velocity with which the blood iſſuing from the heart would flow through the aorta, abſtracting from the reſiſtance; $x=$ the variable length of the aorta, deſcribed by the blood guſhing from the heart; $z=$ the time in which the length x is deſcribed. Hence the mean variable velocity of the blood contiguous to the ventricle, or the mean velocity of the ventricle itſelf, is $=\frac{sv}{S}$; the motion of the ventricle $=p\times\frac{sv}{S}$; the motion of the iſſuing of the blood $=sv\times\overline{l+x}$; the ſum of theſe, or the power of the ventricle $=sv\times\overline{\frac{p}{S}+l+x}$. But it is $v=\frac{\dot{x}}{z}$. Whence by Newton's inverſe method of fluxions, the power of the ventricle will be found $\frac{sx}{z}\times\overline{\frac{p}{S}+\frac{x}{2}+l}$.

Now, ſince $z=t$, it will be $sx=q$. Hence the power of the ventricle $= \frac{q}{t}\times\overline{\frac{p}{S}+\frac{q}{2s}}+l$. In the ſame manner the power of the right ventricle will be found $=\frac{q}{t}\times\overline{\frac{\pi}{\Sigma}+\frac{q}{2\sigma}}+\lambda$. Here the ſame things are ſignified by the greek letters in the right ventricle, as by the italic letters in the left. Hence the whole power of the heart $=\frac{q}{t}\times\overline{\frac{p}{S}+\frac{\pi}{\Sigma}+\frac{q}{2s}+\frac{q}{2\sigma}}+l+\lambda$ Q. E. I.

If we ſuppoſe $p=8$ ounces avoirdupois $=13.128$ cubic inches; $\pi=4=6.564$; $S=10$ ſquare inches; $\Sigma=10$; $l=2$ inches; $\lambda=1\frac{1}{2}$; $q=2$ ounces avoirdupois $=3.282$ cubic inches; $s=0.4185$ ſquare inches; $\sigma=0.583$; $t=0.\ 1''$. The power of the ventricles will be equal to the motion of the underwritten weights, that is,

	℔	oz.
Of the left ventricle	9	1
Of the right ventricle	6	3
Of the whole heart	15	4

Of which weights the velocity will be ſuch, as that a line of an inch long might be deſcribed by the ſame in a ſecond.

Weight, &c. *of the* HEARTS of children, compared with thoſe of grown perſons.

Dr. Bryan Robinſon has made ſeveral uſeful obſervations on this ſubject, which are as follow.

1. The weight of the heart with reſpect to the weight of the body, is greater in children than in grown perſons, in proportion of 3 to 2. Hence the weight of the heart, with reſpect to the weight of the body, leſſens continually from the birth, till the bodies come to their full growth.

2. The quantity of blood which flows through the heart or lungs in a given time, in proportion to the weight of the heart, or quantity of blood contained in the body, which quantity of blood is proportional to the weight of the heart, is greater in children than in grown bodies, in the proportion of 20 to 7; which is the proportion of their pulſes in a minute. Hence the quantity of blood that flows through the heart or lungs, in a given time, in proportion to the whole quantity of blood contained in the body, leſſens continually from the birth, till bodies arrive at their full growth.

3. The velocity of the blood with reſpect to its quantity, which quantity is as the weight of the heart, is much greater in children, than in grown perſons, in the proportion of 80 to 7. Hence, tho' the blood of children moves ſlower than the blood of grown people; yet for its quantity, it moves much quicker, and paſſes much oftner thro' the lungs. On which account the blood of children, notwithſtanding the ſlowneſs of its motion, may by paſſing oftner through the lungs, and thereby receiving more of the acid of the air, in proportion to its quantity, be more fluid, and of a brighter colour, than the blood of grown perſons.

4. The quantity of blood that flows through the heart or lungs in a given time, in proportion to the weight of the body, is greater in children than in grown bodies; in the proportion of 30 to 7. Hence, though the velocity of the blood is leſs in children than in grown bodies, yet its motion with reſpect to the weight of the body is greater.

5. The velocity of the blood with reſpect to the length of body, is greater in children than in grown bodies, in the proportion of 20 to 7, which is the proportion of their pulſes in a minute. Hence the velocity of the blood and number of pulſes in a minute, with reſpect to the length of the body, leſſen continually in growing perſons, till they arrive at their full growth.

HEART-BURN, *cardialgia*, in medicine. See the articles CARDIALGIA and SODA.

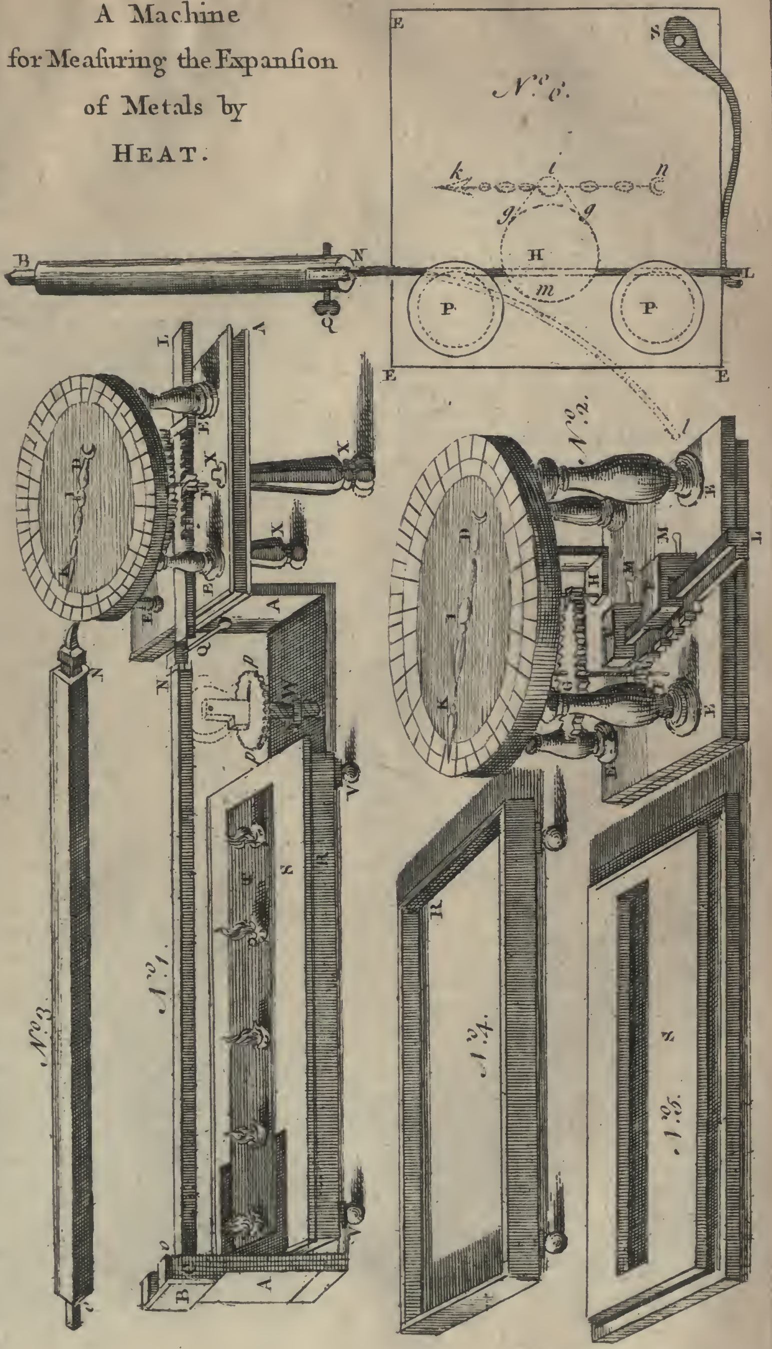
HEART, in the manege. A horſe that works in the manege with conſtraint and irreſolution, and cannot be brought to conſent to it, is ſaid to be a horſe of two hearts.

HEART-SHELL, a name given to two different ſpecies of the cardia. Thus 1. The elegant, compreſſed, and marginated heart-ſhell, or heart-cockle, is an extremely tender and delicate ſpecies, about an inch and a quarter in length, and an inch in diameter. 2. The ſharp-backed cardia, with elegant variegations, commonly called the Venus heart-ſhell, much of the ſame ſtructure, delicacy, and variety of colouring with the former. See the article CARDIA.

HEAT, in phyſiology, one of the ſecondary qualities of bodies, produced by fire, and oppoſed to cold. See COLD.

Under the article fire, we conſidered the ſun as the principal ſource of heat upon the earth's ſurface, and the confines of the

A Machine for Measuring the Expanſion of Metals by HEAT.



J. Jefferys sculp

the earth and atmoſphere: without this all the bodies upon our globe would doubtleſs grow rigid, lifeleſs, and fixed. It is this that ſtirs within them, as the main ſpring of their actions. Hence vegetation and animalization are evidently promoted; and hence the ocean and the atmoſphere continue in a fluid ſtate. See VEGETATION.

Heat in us is properly a ſenſation, excited by the action of fire; or it is the effect of fire on our organs of feeling. See FIRE. Hence it follows, that what we call heat is a particular idea or modification of our own mind, and not any thing exiſting in that form in the body that occaſions it. Heat, ſays Mr. Locke, is no more in the fire that burns the finger, than pain is in the needle that pricks it. In effect, heat in the body that gives it, is only motion; and in the mind, only a particular idea or diſpoſition of the ſoul.

Heat in the hot body, according to 'S Graveſande, is an agitation of the parts of the body, made by means of the fire contained in it: by ſuch an agitation a motion is produced in our bodies, which excites the idea of heat in our mind; ſo that heat in reſpect of us is nothing but that idea, and in the hot body nothing but motion. If ſuch motion expel the fire in right lines, it gives us the idea of light; if in a various and irregular motion, only heat. See LIGHT.

Heat, with reſpect to our ſenſations, or the effect produced on us by a hot body, is eſtimated by its relation to the organ of feeling; no object appearing to be hot, unleſs its heat exceed that of our body. Whence the ſame thing to different perſons, or, at different times, to the ſame perſon, ſhall appear both hot and cold. The degree of heat is meaſured by the expanſion of the air, or ſpirit in the thermometer. See THERMOMETER.

Under the article FIRE, we conſidered, among the ſeveral other properties of heat, its quality of expanding and dilating bodies. It is found to expand metals conſiderably, as appears from an experiment of Muſchenbroek; the effects of which experiment are digeſted in a table, which having the degrees of expanſion marked in equal parts to the $\frac{1}{12500}$ part of an inch, we have given under the article EXPANSION.

The ingenious Muſchenbroek contrived a machine for meaſuring the leaſt alteration of dimenſions in metals by heat, the deſcription of which is this: plate CXXVIII. nº 1. repreſents the whole machine with all its parts together, as it is uſed. At one end of this is a braſs machine, L E, &c. which for the better ſhewing its parts is delineated, (*ibid.* nº 2.) as ſeen from another ſide. D is a circular plate $2\frac{1}{10}$ inches diameter, the circumference of which is divided into degrees: this plate ſtands upon four pillars E E E E, which join it to the lower braſs plate; and between the two plates, there is a perpendicular ſteel arbor or axis F, which has on its lower part a pinion of ſix leaves or teeth, and on its upper end a wheel of ſixty teeth, marked G: there is alſo another axis I H, ſupported by a cock H, which comes down from the upper plate; ſerving to turn the index I K, and having at its lower end a pinion of ſix leaves to take the teeth of the wheel G, by one turn of which wheel the index is carried round all the diviſions: L is a rack, or ſtraight piece of metal with teeth, which take the leaves of the pinion F, while it ſlides along under two ſmall cocks P P; being preſſed towards the pinion F by means of two ſcrews, M, M; or drawn from it as there is occaſion: there are twenty-five teeth in each inch of this piece; and as it moves foreward and backward, the pinion F is carried round, and conſequently the wheel G, which carries round the pinion H, together with the index I K. Let us ſuppoſe the rack to have run the length of an inch, then F and G will have turned round $4\frac{1}{6}$ times; and conſequently, the pinion H will have gone round $10 \times 4\frac{1}{6} = 41\frac{2}{3}$ times, becauſe H turns round ten times for G once: ſo that the index I K will have moved round $41\frac{2}{3}$ times, or 12500 degrees; therefore, when the index goes but from one degree to another, the rack L moves but the 12500th part of an inch; and as the motion of the index over half a degree is very ſenſible, we may perceive when the rack has moved $\frac{1}{25000}$ part of an inch.

Nº 3, *ibid.* repreſents a ſquare bar of metal, upon which the experiment is made, $5\frac{8}{10}$ inches long, and $\frac{3}{10}$ of an inch thick. Its end *O* has a ſmall tail, that it may communicate no heat to the iron plate A, into which it is received at B (*ibid.* nº 1.) and fixed by a ſcrew C. Its other end N has a hole in it, thro' which goes the ſcrew Q, that makes it faſt to the rack L.

The bar being thus fixed, cannot become longer without puſhing forward the rack L, and thereby moving round the index I K, by means of the wheel and pinions F, G, H; ſo likewiſe when it grows ſhorter, they muſt move the contrary way.

Now in order to apply the heat of burning ſpirits, there is a box, R, made of braſs (*ibid.* n° 4) $3\frac{1}{2}$ inches long, $1\frac{2}{10}$ inch wide, and $\frac{4}{10}$ inch deep; which is covered at top with a piece of ſtone, S, repreſented in n° 5. with the under-ſide uppermoſt, the uſe of which is, to prevent the ſpirits from taking fire. It has a long hole cut thro' the middle, into which is let a braſs plate T, (*ibid.* n° 1.) with five ſmall equidiſtant holes, to tranſmit ſo many wicks of fine cotton; which being lighted, one or more at a time, cauſe the bar to expand, and the degree whereof is ſhewn by the index.

N° 6. repreſents the lower frame with Dr. Deſaguliers's alterations, where B N is the round rod of metal to be tried with the ſteel-plate made faſt at N by the pin Q. This plate, the natural ſituation of which is N *l*, is here kept ſtraight in the poſition N L, by means of the ſpring S L; and is directed by the grooves of the pullies P P, ſo that its upper-ſide preſſes on the roller H. The dotted circles *mgg*, repreſent the wheel above on the axis of H; and *gig*, the watch-chain, carrying round the laſt roller *i*, an index *nik*, as in n° 1.

It has been juſtly obſerved by ſome of our modern philoſophers, that actual or abſolute heat, is to ſenſible or relative heat, the ſame as motion is to velocity: for abſolute heat is nothing but the whole motion of all the parts of the ignited body; and ſenſible, or relative heat, reſpects only the comparative velocity of the parts. Thus, equal bulks of mercury and water ſet in a ſand-heat, where the heat of the fire may be uniformly communicated to both, will acquire in equal times equal degrees of abſolute heat: but the relative heat of the water, or that which is ſenſible to the finger, will be near 14 times as great as that of the mercury, becauſe the water, having 14 times a leſs quantity of matter, will admit of velocity ſo much in proportion greater.

Again, if mercury and water have the ſame relative or ſenſible heat, that is, if both are heated in ſuch a manner as to cauſe an equal aſcent in the thermometer, then a quantity of mercury will heat 14 times as much water as the ſame quantity of water will do; or it will make the ſame quantity of cold water 14 times hotter than the ſame quantity of hot water can. All which is eaſy to be ſhewn by experiment, and abundantly proves, that heat and fire are wholly owing to the velocity of the parts of the heated or ardent body: on which theory the various phænomena of heat, cold, fire, burning, &c. are rationally accounted for. For firſt we are to conſider, that cold and heat are only comparative terms, or that the ſame thing may either be too hot, or too cold, according to the relative idea or ſtandard-degree. Thus ice or ſnow, is ſaid to be cold with reſpect to the finger, but ice or ſnow is warm if compared to a freezing mixture, ſo that if (as we commonly do) we make the hand or any part of the body the ſtandard of heat and cold, or the term of compariſon, then it is evident, 1. If the parts of any body applied to the hand have the ſame velocity as the parts of the hand, ſuch a body we naturally pronounce is neither hot nor cold. 2. If the particles of the body have a greater velocity than thoſe of the hand, we pronounce it warm, if the exceſs be ſmall; but hot, if it be great. 3. If the velocity of the parts of the body applied be leſs than that in the hand, the ſenſation then is what we call cold, which alſo may be in various degrees. 4. Hence it is plain there can be no ſuch thing as abſolute cold, but where the particles of matter are abſolutely quieſcent, or at reſt. 5. Hence alſo, there can be no ſuch thing as abſolute heat, becauſe no degree of velocity can be aſſigned but a greater is ſtill aſſignable, till we come to infinity; where we are quite loſt, as having no idea of infinite velocity or heat.

From this theory of heat and cold, we may conclude, that there is no body in nature whoſe parts are not in motion, in ſome degree, ſince we have yet been able to diſcover no ultimate degree or limit of cold; and if any ſuch thing were to be found in nature, it is likely that it would be as impoſſible to bear or endure the teſt, as any extreme degree of heat; both heat and cold naturally tending to deſtroy the animated part, or teſt, in the extreme degrees: cold, by deſtroying the vital motion, and fixing the part rigid and inflexible; but heat, by putting the parts into too great an agitation, cauſing a greater velocity of the fluids and diſſipation, and a force of tenſion in the ſolids, beyond what the natural ſtate of the body can bear; and therefore it will inevitably deſtroy it.

Kinds, *degrees*, *directions*, &c. *of* HEAT, in chemiſtry, *&c.* See the article FIRE.

HEAT, in geography. The earth being farther removed from the ſun in ſummer than in winter, as was ſhewn under the article EARTH, it may be aſked, how it comes to paſs, that ſince the ſun is the fountain of heat as well as light, our winters are much colder than our ſummers. In anſwer to this, it is to be conſidered that the rays of the ſun fall with much leſs obliquity upon the ſurface of the earth, on our ſide of the equator in the ſummer, than in the winter; and therefore they not only act more forcibly upon it, but a greater quantity of them fall upon a given place. For it is ſhewn in mechanics, that a moving body, ſtriking perpendicularly on another, acts on it with all its force, and that a body ſtriking obliquely, acts with the leſs force, the more it deviates from the perpendicular. Now fire, moving in right lines, muſt obſerve the ſame mechanical law as other bodies; and conſequently its action muſt be meaſured by the angle of incidence; and hence fire ſtriking on any obſtacle in a direction parallel thereto, has no ſenſible effect, by reaſon the ratio is almoſt infinite, *i. e.* nothing: hence the ſun radiating on the earth in the morning, ſcarce produces any warmth at all. Again, in the winter, beſides that the ſun is much lower in the heaven when at its meridian height, than in the ſummer, its rays paſs through a longer portion of the earth's atmoſphere, by which great part are intercepted, and ſome by various refractions and reflections, turned another way. See the article ATMOSPHERE.

And laſtly, in ſummer, the ſun continues with us ſixteen hours, and is abſent but eight, whereas in winter it is with us but eight hours, and is abſent ſixteen, all which things conſpire to make a conſiderable alteration with reſpect to heat and cold.

If this be ſo, why is not the weather hotter, when the ſun is in the tropic of cancer, its rays then falling with the leaſt obliquity, and paſſing the ſhorteſt way through the atmoſphere, and the days being then at the longeſt, than it is about a month afterwards, when the ſun is in the next ſign? In anſwer to this, it is to be remembered that bodies are not always the hotteſt at that very inſtant the greateſt degree of heat is applied to them: they require time to heat, as well as to cool; it is the length of time therefore that the heat is applied to them, as well as the degreee of it, that determines the quantity of heat communicated to them. For the like reaſon we find it warmer about two o'clock in the afternoon, than at twelve, when the ſun is in its meridian altitude, and its rays fall thickeſt and moſt forcibly upon the earth.

The diverſity of the heat of climates and ſeaſons ariſing chiefly from the different angles under which the ſun's rays ſtrike upon the ſurface of the earth, Dr. Hally gives a mathematical computation of the effect of the ſun under the different ſeaſons and climates, going upon the mechanical principle already laid down: whence the vertical ray which is of the greateſt heat being put for radius, the force of the ſun on the horizontal ſurface of the earth will be to that as the ſine of the ſun's altitude at any other time: but how ſtrictly juſt this calculation may be, for reaſons already aſſigned, and from the following conſiderations, we wholly leave to the ſagacity of our readers to determine. Let it be conſidered, that the different degrees of heat and cold in different places depend in a very great meaſure upon the accidents of ſituation, with regard to mountains and vallies, and the ſoil. The firſt greatly helps to chill the air by the winds which come over them, and which blow in eddies thro' the levels beyond; and mountains, ſometimes turning a concave ſide to the ſun, have the effects of a burning mirror upon the ſubject plain; and the like effect is ſometimes had from the convex parts of clouds, either by refraction or reflection. As to ſoils, a ſtony, ſandy, or chalky earth, it is known, reflects moſt of the ſun's rays into the air again, and retains but few, by which means a conſiderable acceſſion of heat is derived to the air; as, on the contrary, black, looſe ſoils abſorb moſt of the rays, and return few into the air, ſo that the ground is much the hotter.

The following table of the heat of different climates is computed for every tenth degree of latitude, to the equinoctial and tropical ſun; by which an eſtimate may be made of the intermediate degrees.

Lat.	Sun in ♈ ♎	Sun in ♋	Sun in ♑
0	20000	18341	18341
10	19696	20290	15854
20	18797	21737	13166
30	17321	22651	10124
40	15321	23048	6944
50	12855	22991	3798
60	10000	22773	1075
70	6840	23543	000
80	3473	24673	000
90	0000	25055	000

Hence are deducible the following corollaries. 1. That the equinoctial heat, when the ſun becomes vertical, is as twice the ſquare of the radius, which may be propoſed as a ſtandard to compare with in all other caſes. 2. That under the equinoctial, the heat is as the ſine of the ſun's declination. 3. That in the frigid zones, where the ſun ſets not, the heat is as the circumference of a circle into the ſine of the altitude at 6; and conſequently that in the ſame latitude theſe aggregates of warmth are as the ſine of the ſun's declination; and at the ſame declination of the ſun, they are as the ſines of the latitudes into the ſigns of the declination. 4. That the equinoctial day's heat is every where as the coſine of the latitude. 5. In all places where the ſun ſets, the difference between the ſummer and winter-heats, when the declinations are contrary, is equal to a circle into the ſine of the altitude at 6 in the ſummer parallel; and conſequently theſe differences are as the ſine of the latitude into or multiplied by the ſines of declination. 6. From the foregoing table, it appears that the tropical ſun under the equinoctial, has of all others the leaſt force. Under the pole, it is greater than any other day's heat whatever; being to that of the equinoctial as 5 to 4.

From the table and theſe corollaries, a general idea may be conceived of the ſum of all the actions of the ſun in the whole year; and thus that part of heat which ariſeth ſimply from the preſence of the ſun, may be brought to a geometrical certainty. The heat of the ſun for any ſmall portion of time is always as a rectangle contained under the ſine of the angle of incidence of the rays producing heat at that time.

Heat is uſually divided by the ſchool philoſophers into actual and potential; the former of which is that hitherto treated of, and the latter that which we find in pepper, wine, and certain chemical preparations, as of oil of turpentine, brandy, quick-lime, &c.

The peripatetics account for the heat of quick-lime from an antiperiſtaſis. The epicureans, and other corpuſcularians, attribute even potential heat to atoms, or particles of fire detained and locked up in the pores of theſe bodies, and remaining at reſt therein, which being excited to action again by the heat and moiſture of the mouth, or by the effuſion of cold water, or the like cauſe, then break their incloſures, and diſcover what they are.

In the memoirs of the french academy, for the year 1713, the reader may find this doctrine well illuſtrated by M. Lemery, the younger, in the inſtances of quick-lime, regulus of antimony, tin, &c. which account Mr. Boyle endeavours to ſet aſide, and ſubſtitute a mechanical property, *viz.* a peculiar texture of parts in theſe caſes in lieu of fire. See Boyle's Mechanical Origin of Heat and Cold.

Heat, in the animal œconomy, known by the ſeveral names of natural heat, vital heat, innate heat, and animal heat, is commonly ſuppoſed to be that generated by the attrition of the parts of the blood, occaſioned by its circulatory motion, eſpecially in the arteries.

To what organs, or operations, the heat of the human body, and other animal bodies, is owing, is hitherto extremely doubtful. The opinions that at preſent prevail are, 1. That the heat of animal bodies is owing to the attrition betwixt the arteries and the blood. 2. That the lungs are the fountain of this heat. 3. That the attrition of the parts of the ſolids on one another produce it. 4. That it is owing to the mechanical attrition of the particles of our fluids. To which opinions Dr. Stevenſon of Edinburgh, adds a 5, *viz.* That whole proceſs by which our aliment and juices are conſtantly undergoing ſome alteration.

The reaſonings in favour of theſe ſevera opinions may be ſeen at large, as lai down by the above-mentioned author i an eſſay on the cauſe of animal heat, i the Medical Eſſays, vol. vi. The chie arguments in favour of the firſt opinion ar ſure, that if an artery is tied, or cut, the part to which it goes, turns cold; and on the ceaſing of the pulſation of the arteries, cold and death follow. An increaſe of heat attends a briſk circulation, and a languid circulation is accompanied with a ſmall heat. One who burns in a fever, or is hot with exerciſe, has a full and frequent pulſe. In cold faintings, chloroſis, *&c.* the pulſe is ſmall and ſlow. To theſe they add, that the thermometer ſhews the arterial blood to be a little hotter than that of the veins.

This is accounted for from the conical figure of the arteries, from their fluxes and branches into exquiſitely ſmall capillaries; whence the reſiſtance, and conſequently the attrition muſt be great, from the number, ſtrength, and elaſticity of their coats; from the propelling power of the heart, and their ſtrong reſiſtance. From all theſe it is inferred, that the particles of blood perpetually geting new motions, directions, and rotations, are attenuated, condenſed, have their angles grinded off, and are made homogeneous: hence, it is ſaid, follows the fluidity, red colour, and heat of the maſs, which is here perfected. See the articles ARTERY, HEART, CIRCULATION, and BLOOD.

The ſecond opinion is, that the lungs are the fountain of heat in the human body. All that has been ſaid for the blood's being heated in the arteries, is advanced to prove this hypotheſis, with conſiderable additions, *viz.* that in the lungs the blood veſſels every where attend, divide, and ſubdivide, along with the ramifications of the wind-pipe, and as theſe are perpetually changing their ſituation and form, becoming longer, or ſhorter, making more acute, or more obtuſe angles, ſo muſt the concomitant blood-veſſels every moment make new angles, and give the blood new directions; that at laſt it enters into an exquiſitely fine net-work, ſpreads every where on the vaſtly thin air veſicles, where theſe air bladders are perpetually changing their angles, points of contact, their form, volume, interſtices, and ſo forth. From theſe and the elaſticity of the air, and weight of the atmoſphere, the blood is ſaid to be churned, preſſed backward and forward, broken and kneaded together, diſſolved and condenſed, made red and hot in reſpiration.

The third opinion is, that the cauſe of the animal heat is owing to the action of the ſolid parts upon one another. The reaſon in ſupport of this opinion, is, that the heart and arteries move moſt; thence that it is natural to think, that the heat ſhould be owing to this motion.

The fourth opinion is, the mechanical attrition of the particles of the fluids upon one another. Dr. Stevenſon obſerves, that thoſe who ſupport this hypotheſis, muſt not only ſuppoſe that mechanical attrition begets heat, but begets itſelf without diminution; that they muſt not only ſhew what ſets this attrition agoing, but what maintains it, becauſe all mechanical force perpetually decreaſes in a reſiſting medium; in ſhort, that they muſt ſhew the poſſibility of a perpetuum mobile, the impoſſibility of which they themſelves demonſtrate.

The fifth opinion is, what Dr. Stevenſon calls the animal proceſs, or that proceſs by which our aliment and fluids are perpetually undergoing ſome alteration. This proceſs, according to that writer, may be one *ſui generis*, ſomewhat of a middle nature betwixt fermentation and putrefaction; and he thinks it comes ſo near to the latter, that he chooſes to call it by that name. In putrefaction, which is a moſt powerful diſſolvent of bodies, the inteſtine action of their minute particles creates, collects, or ſome way or other is the cauſe or means of heat. The doctor thinks it probable that this proceſs is conſtantly carried on in all our juices, eſpecially where there is blood; and this is chiefly in the veins, ſo that the blood is both the fountain of heat and the firſt ſpring of motion.

The late Dr. Mortimer, in the Philoſ. Tranſ. nº 476. gives it as his opinion, that the heat of animals is explicable from the phoſphorus and air they contain. Phoſphorus exiſts, at leaſt in a dormant ſtate, in animal fluids; and it is alſo known, that they all contain air: it is therefore only neceſſary to bring the phoſphoreal and aereal particles into contact, and heat muſt of conſequence be generated.

HEATH, *erica*, in botany, a genus of the octandria-monogynia claſs of plants, the flower of which conſiſts of one erect and quadrifid petal; and its fruit is a quadrilocular capſule, containing a great number of very ſmall ſeeds.

The diſtilled water of heath-flowers is recommended for ſore eyes, as alſo for the colic; and fomentations of them are ſaid to be good in the gout and paralytic caſes.

Berry-bearing-HEATH, a name given to empetrum. See EMPETRUM.

HEATH HEN, a name ſometimes given to the grouſe. See the article GROUSE.

HEATHENS, in matters of religion, the ſame with pagans. See PAGAN.

HEAVING, in the ſea-language, ſignifies throwing any thing over-board. Alſo turning about the capſtan, is called heaving at the capſtan. Likewiſe, when a ſhip being at anchor, riſes and falls by the force of the waves, ſhe is ſaid to heave and ſet.

HEAVEN, *cœlum*, literally ſignifies the expanſe of the firmament, ſurrounding our earth, and extended every way to an immenſe diſtance.

The Hebrews acknowledged three heavens: the firſt the aerial heaven, in which the birds fly, the winds blow, and the ſhowers are formed; the ſecond, the firmament in which the ſtars are placed; the third, the heaven of heavens, the reſidence of the Almighty, and the abode of ſaints and angels.

Heaven is conſidered by chriſtian divines and philoſophers, as a place in ſome remote part of infinite ſpace, in which the omnipreſent Deity is ſaid to afford a nearer and more immediate view of himſelf, and a more ſenſible manifeſtation of his glory, than in the other parts of the univerſe. This is often called the empyrean, from that ſplendor with which it is ſuppoſed to be inveſted; and of this place the inſpired writers give us the moſt noble and magnificent deſcriptions.

The pagans conſidered heaven as the reſidence only of the celeſtial gods, into which no mortals were admitted after death, unleſs they were deified. As for the ſouls of good men, they were conſigned to the elyſian fields. See the article ELYSIUM.

Cryſtalline HEAVENS. See the article CRYSTALLINE.

HEAVINESS, in general, the ſame with weight or gravity. See GRAVITY and WEIGHT.

HEAVY, in the manege. A horſe is ſaid to reſt heavy upon the hand, when, thro' the ſoftneſs of his neck, the weakneſs of his back, and the weight of his fore-quarters, or through wearineſs, he throws himſelf upon the bridle, but without making any effort to eſcape the horſeman's hand.

By ſtopping him, and making him frequently go back, you may make him light upon the hand; that is, if his heavineſs proceeds from lazineſs and ſtiffneſs; but if it is occaſioned by a defect in his back, there is no remedy for it.

HEBDOMARY, a ſolemnity of the antient Greeks, in honour of Apollo, in which the Athenians ſung hymns in honour of that god, and carried in their hands branches of laurel. The word ſignifies the ſeventh day, this ſolemnity being obſerved on the ſeventh day of every lunar month.

HEBENSTRETIA, in botany, a genus of the didynamia-angioſpermia claſs of plants, the flower of which is monopetalous, with a cylindraceous tube ſhorter than the calyx, and quadrifid at the limb; the fruit is an oblong capſule, containing two oblong ſeeds, convex and furrowed on one ſide, and plane on the other.

HEBRAISM, an idiom or manner of ſpeaking peculiar to the hebrew language. See the next article.

HEBREW, or HEBREW LANGUAGE, that ſpoken by the antient Jews, and wherein the Old Teſtament is wrote.

This appears to be the moſt antient of all the languages in the world, at leaſt we know of none older: and ſome learned men are of opinion, that this is the language in which God ſpoke to Adam in Paradiſe, and in which the ſaints will ſpeak in heaven.

The books of the Old Teſtament are the only pieces to be found, in all antiquity, written in pure Hebrew; and the language of many of theſe is extremely ſublime: it appears perfectly regular, and particularly ſo in its conjugations; indeed, properly ſpeaking it has but one conjugation, but this is varied in each ſeven or eight different ways, which has the effect of ſo many different conjugations, and affords a great variety of expreſſions to repreſent by a ſingle word the different modifications of a verb, and many ideas which in the modern, and in many of the antient and learned languages, cannot be expreſſed without a periphraſis.

The primitive words, which are called roots, have ſeldom more than three letters or two ſyllables.

In this language there are twenty-two letters, only five of which are uſually reckoned vowels, which are the ſame with ours, *viz. a, e, i, o, u,* but then each vowel is divided into two, a long and a ſhort, the ſound of the former being ſomewhat grave and long, and that of the latter ſhort and acute; it muſt however be remarked, that the two laſt vowels have ſounds that differ in other reſpects beſides quantity, and a greater or leſs elevation. To theſe ten or twelve vowels may be added others called ſemivowels, which ſerve to connect the conſonants, and to make the eaſier tranſitions from one to another. The number of accents in this language are, indeed, prodigious: of theſe there are near forty, the uſe of ſome of which, notwithſtanding all the enquiries of the learned, are not yet perfectly known. We know, in general, that they ſerve to diſtinguiſh the ſentences like the points called commas, ſemicolons, *&c.* in our language; to determine the quantity of the ſyllables, and to mark the tone with which they are to be ſpoke or ſung. It is no wonder then, that there are more accents in the hebrew than in other languages, ſince they perform the office of three different things, which in other languages are called by different names.

HEBREWS, or *Epiſtle to the* **HEBREWS**, a canonical book of the New Teſtament.

Though St. Paul did not prefix his name to this epiſtle, the concurrent teſtimony of the beſt authors, antient and modern, affords ſuch evidence of his being the author of it, that the objections to the contrary are of little or no weight. His mentioning himſelf in it, as lately a priſoner in Italy, and his promiſe to viſit the Hebrews, together with Timothy, who had been releaſed from impriſonment, both denote the writer, and the time of his writing this epiſtle, that it was juſt after the deliverance of St. Paul from his firſt trial at Rome.

The Hebrews, to whom this epiſtle was wrote, were the believing Jews of Paleſtine, and its deſign was to convince them, and, by their means, all the jewiſh converts, wheresoever diſperſed, of the inſufficiency and aboliſhment of the ceremonial and ritual law. In order to which he undertakes to ſhew, firſt, the ſuperior excellency of Chriſt's perſon above that of Moſes: ſecondly, the ſuperiority of Chriſt's prieſthood above the levitical: thirdly, the mere figurative nature, and utter inſufficiency of the legal ceremonies and ſacrifices: and, fourthly, that to forſake the moſaical law, was not, as the Jews boldly aſſerted, to apoſtatize from God, but was their indiſpenſible duty and obligation. Theſe particulars are intermixed with proper inferences and exhortations, all tending to ſhew the jewiſh chriſtians the unreaſonableneſs, folly, and danger of relapſing into judaiſm.

HEBRIDES, iſlands on the weſt of Scotland, of which Sky, Mull, Iſla, and Arran are ſome of the largeſt.

HECATOMB, among the antient pagans, was the ſacrifice of an hundred bulls or oxen; or, in a leſs confined ſenſe, an hundred animals of any ſort.

Pythagoras is ſaid to have ſacrificed an hecatomb to the muſes, through joy and gratitude for his having diſcovered the demonſtration of the XLVIIth propoſition in the firſt book of Euclid, *viz.* that, "In a rectangled triangle, the ſquare of "the hypothenuſe is equal to the ſquares "of the other two ſides."

Julius Capitolinus relates, that when an hecatomb was to be ſacrificed, they erected for that purpoſe an hundred altars of turf, on each of which they ſacrificed one animal. He adds, that when the emperors offered hecatombs, they ſometimes conſiſted of an hundred lions, an hundred eagles, or the like.

HECATOMBÆON, ἑκατομβαιων, in antient chronology, the firſt month of the athenian year, conſiſting of thirty days, and anſwering to the latter part of our June and beginning of July. It was ſo called on account of the many hecatombs ſacrificed in it.

HECK, an engine to take fiſh in the river Ouſe. A ſalmon heck is a grate for catching that ſort of fiſh.

HECKLE. See the article HATCHEL.

HECKLING *of hemp and flax.* See the articles HEMP and FLAX.

HECTIC, or **HECTIC FEVER**, a kind of ſlow fever, occaſioned by exulcerations of the lungs, and the purulent matter mixing with the blood, and diſturbing its natural motion. The ſymptoms are an unuſual heat in the palms of the hands, a redneſs of the checks, eſpecially after eating; alſo a weak, but quick pulſe, a languid habit of body, and loſs of ſtrength.

It is of the utmoſt conſequence, ſays Dr. Mead, to attempt the cure of this dreadful diſeaſe early; and as it ariſes from inflammations, it requires repeated bleedings. Dr. Pringle recommends the ſame practice, with the uſe of ſetons and iſſues, made in the ſide that is moſt affected. He obſerves, that he found nothing diminiſh the hectic fits ſo much as ſmall but repeated bleedings, eſpecially when ſaline draughts and a cooling diet are taken at the ſame time. In thirſt, heat, and other ſymptoms, the ſigns of a putrid ſtate of the humours, the ptiſan is to be acidulated with the ſpirit of vitriol, and the aliments are to be choſen of the aceſcent kind. A mixture of equal parts of barley-water and ſweet milk, ſeaſoned with ſugar and nutmeg, makes a proper and an agreeable part of diet; and in caſe of coſtiveneſs, let the patient drink a decoction of bran with raiſins and liquorice. Colliquative ſweats are moſt ſafely checked by lime-water, whereof the patient may drink about a pint a day, ſoftened with a little new milk.

A milk-courſe, though much recommended by phyſicians, as having the double advantage of being food and phyſic, ought to be taken with caution; not only becauſe ſome people have a natural averſion to milk, but becauſe in head-achs, acute fevers, flatulencies, bilious looſeneſſes, and bloody ſtools, it is found to be very prejudicial. The preference is generally given to aſſes-milk, as being moſt cooling and detergent; but when it can be conveniently had, whey made of cows-milk, or even of goats, may be ſubſtituted in its room, eſpecially if the goats have been fed on fragrant herbs. In caſe the milk does not agree with the ſtomach, as frequently happens, it ſhould be medicated in the following manner: take of red roſes dried, of balauſtines, pomegranate-rind, and cinnamon, each one dram; and boil them in a pint of cows-milk: when the decoction begins to boil, pour a little cold water into it, to make it ſubſide. Repeat this proceſs ſeveral times, and laſtly ſtrain off the liquor, ſweeten it with ſugar, and ſet it by for uſe. Others recommend equal quantities of milk and an infuſion of male ſpeedwell, ſow-thiſtle, ſage of Jeruſalem, liverwort, colts-foot, ground ivy, maiden-hair, flowers of St. John's wort, and roſes, with a little ſugar a few drops of oil of tartar per deliquium: this muſt be drank pretty warm, and continued for ſix weeks. But above all, freſh butter-milk is ſaid to be the moſt efficacious ſpecific.

Medicines that are gently corroborating are alſo uſeful: ſuch are the ſolution of coral, or mother of pearl, in orange juice; cortex eleutherii, or peruvian bark, made into an electuary with ſyrup of lemons. Heiſter affirms he has cured many of theſe fevers with the bark, in a few days. But above all things, riding daily muſt not be forgot, as being the beſt kind of exerciſe, and highly beneficial in theſe diſtempers.

Hectics attack children ſometimes from voracity, and at others from refrigeration of the body; in which caſes the uſe of the temperate baths of ſweet water, continued for ſome time, is ſaid to be of great ſervice; and to remove the obſtructions of the meſeraic glands and veſſels, the frequent but ſparing uſe of the following ſaline aperient mixture will be neceſſary: take of ſalt of tartar, nitre, and arcanum duplicatum, each two drams; ſal ammoniac, three drams: mix them all together, and let a little of the mixture be put into the child's drink, according to his age and ſtrength.

HEDERA, IVY, in botany. See IVY.

HEDERA TERRESTRIS, GROUND-IVY, a genus of plants called by Linnæus glechoma. See the articles GLECHOMA and GROUND-IVY.

HEDGES, in agriculture, are either planted to make fences round incloſures, or to divide the ſeveral parts of a garden. When they are deſigned as outward fences, they are planted either with haw thorn, crabs, or black-thorn; but thoſe hedges which are planted in gardens, either to ſurround wilderneſs-quarters, or to ſcreen the other parts of a garden from ſight, are planted according to the fancy of the owner, ſome preferring ever-greens, in which caſe the holly is beſt; next the yew, then the laurel, lauruſtinus, phillyrea, *&c.* others prefer the beech, the hornbeam, and the elm. See the article GARDEN.

Before planting, it is proper to conſider the nature of the land, and what ſort of plants will thrive beſt in it; and alſo, what is the ſoil from whence the plants are to be taken. As for the ſize, the ſets ought to be about the bigneſs of one's little finger, and cut within about four or five inches of the ground; they ought to be freſh taken up, ſtraight, ſmooth, and well rooted. Thoſe plants that are raiſed in the nurſery, are to be preferred.

In planting outſide hedges, the turf is to be laid with the graſs-ſide downwards, on that ſide of the ditch the bank is deſigned to be made; and ſome of the beſt mould ſhould be laid upon it to bed the quick, which is to be ſet upon it a foot aſunder.

When the firſt row of quick is ſet, it muſt be covered with mould, and when the bank is a foot high, you may lay another row of ſets againſt the ſpaces of the former, and cover them as you did the others: the bank is then to be topped with the bottom of the ditch, and a dry or dead-hedge laid, to ſhade and defend the under-plantation. Stakes ſhould then be driven into the looſe earth, ſo low as to reach the firm ground: theſe are to be placed at about two feet and a half diſtance, and in order to render the hedge yet ſtronger, you may edder it, that is, bind the top of the ſtakes with ſmall long poles, and when the eddering is finiſhed, drive the ſtakes anew.

The quick muſt be kept conſtantly weeded, and ſecured from being cropped by cattle; and in February it will be proper to cut it within an inch of the ground, which will cauſe it ſtrike root afreſh, and help it much in the growth.

When an hedge is about eight or nine years growth, it will be proper to plaſh it; for the method of doing which, ſee the article PLASHING.

The crab is frequently planted for hedges; and if the plants are raiſed from the kernels of the ſmall wild crabs, they are much to be preferred to thoſe raiſed from the kernels of all ſorts of apples without diſtinction; becauſe the plants of the true ſmall crab never ſhoot ſo ſtrong as thoſe of the apples, and may therefore be better kept within the proper compaſs of an hedge.

The black-thorn, or ſloe, is frequently planted for hedges; and the beſt method of doing it, is to raiſe the plants from the ſtones of the fruit, which ſhould be ſown about the middle of January, if the weather will permit, in the place where the hedge is intended; but when they are kept long out of the ground, it will be proper to mix them with ſand, and keep them in a cool place. The ſame fence will do for it when ſown, as when it is planted.

The holly is ſometimes planted for hedges; but where it is expoſed, there will be great difficulty in preventing its being deſtroyed; otherwiſe, it is by far the moſt beautiful plant, and being an ever-green, will afford much better ſhelter for cattle in winter, than any other ſort of hedge. The beſt method of raiſing theſe hedges, is to ſow the ſtones in the place where the hedge is intended, and where this can be conveniently done, the plants will make a much better progreſs than thoſe that are tranſplanted; but theſe berries ſhould be buried in the ground ſeveral months before they are ſown. The way to do this, is to gather the berries about chriſtmas, when they are uſually ripe, and put them into large flower-pots, mixing ſome ſand with them; then dig holes in the ground into which the pots muſt be ſunk, covering them over with earth, about ten inches thick. In this place they muſt remain till the following October, when they ſhould be taken up, and ſown in the place where the hedge is intended to be made. The ground ſhould be well trenched, and cleared from the roots of all bad weeds, buſhes, trees, &c. Then two drills ſhould be made, at about a foot-diſtance from each other, and about two inches deep, into which the ſeeds ſhould be ſcattered pretty cloſe, leſt ſome ſhould fail. When the plants grow up, they muſt be carefully weeded; and if they are deſigned to be kept very neat, they ſhould be cut twice a year, that is in May and in Auguſt; but if they are only deſigned for fences, they need only be ſheered in July. The fences for theſe hedges while young, ſhould admit as much free air as poſſible: the beſt ſort are thoſe made with poſts and rails, or with ropes drawn through holes made in the poſts; and if the ropes are painted over with a compoſition of melted pitch, brown ſpaniſh colour and oil, well mixed, they will laſt ſeveral years.

Hedges for ornament in gardens are ſometimes planted with ever-greens, in which caſe the holly is preferable to any other. Next to this, moſt people prefer the yew; but the dead colour of its leaves renders thoſe hedges leſs agreeable. The laurel is one of the moſt beautiful ever-greens, but the ſhoots are ſo luxuriant that it is difficult to keep it in any tolerable ſhape; and as the leaves are large, to prevent the diſagreeable appearance given them by their being cut through with the ſheers, it will be the beſt way to prune them with a knife, cutting the ſhoots juſt down to a leaf. The lauruſtinus is a very fine plant for this purpoſe; but the ſame objection may be made to this as to the laurel; this, therefore, ought only to be pruned with a knife in April, when the flowers are going off; but the new ſhoots of the ſame ſpring muſt by no means be ſhortened. The ſmall-leaved and rough-leaved lauruſtinus are the beſt plants for this purpoſe. The true phillyrea is the next beſt plant for hedges, which may be led up to the height of ten or twelve feet, and if they are kept narrow at the top, that there may not be too much width for the ſnow to lodge upon them, they will be cloſe and thick, and make a fine appearance. The ilex or ever-green oak, is alſo planted for hedges, and is a fit plant for thoſe deſigned to grow very tall. The deciduous plants uſually planted to form hedges in gardens are, the hornbeam, which may be kept neat with leſs trouble than moſt other plants. The beech, which has the ſame good qualities as the hornbeam; but the gradual falling of its leaves in winter cauſe a continual litter. The ſmall-leaved engliſh elm is a proper tree for tall hedges, but theſe ſhould not be planted cloſer than eight or ten feet. The lime-tree has alſo been recommended for the ſame purpoſe; but after they have ſtood ſome years they grow very thin at bottom, and their leaves frequently turn of a black diſagreeable colour.

Many of the flowering ſhrubs have alſo been planted in hedges, ſuch as roſes, honeyſuckles, ſweet-briar, *&c.* but theſe are difficult to train; and if they are cut to bring them within compaſs, their flowers, which are their greateſt beauty, will be entirely deſtroyed.

HEDGE-HOG. See *Hedge*-HOG.

HEDGE-SPARROW, the brown motacilla, white underneath, and with a grey ſpot behind the eyes. See MOTACILLA.

This is of the bigneſs of the red-breaſt; the head is large and rounded; the eyes ſmall, and their iris hazel; the beak is ſlender; the ears are large and patulous.

HEDMORA, a city of Sweden, in the province of Weſtmania, ſituated on the river Dalecarlia, fifty miles north-weſt of Upſal: eaſt long. 15° 55′, and north lat. 60° 16′.

HEDYOTIS, in botany, a genus of the tetrandria-monogynia claſs of plants, the flower of which is monopetalous and infundibuliform; and its fruit is a bilocular capſule, containing a great number of ſeeds.

HEDYSARUM, the FRENCH HONEY-SUCKLE, in botany, a genus of the diadelphia-decandria claſs of plants, the corolla of which is papilionaceous and ſtriated; the fruit of a bivalve articulated pod, each joint of which is roundiſh, compreſſed, and containing one kidney-ſhaped-ſeed.

This plant is deobſtruent and vulnerary.

HEEL, in anatomy, the hind-part of the foot. See FOOT and CALCANEUM.

HEEL *of a horſe*, the lower hinder part of the foot, comprehended between the quarters, and oppoſite to the toe.

The heel of a horſe ſhould be high and large, and one ſide of it ſhould not riſe higher than the other upon the paſtern. To recover the heels of a horſe that is hoof-bound, you ſhould take out his ſole, and keep his heels very wide, by which they will be reſtored in a month.

HEEL *of a horſeman.* This being the part that is armed by the ſpur, the word is uſed for the ſpur itſelf; as, this horſe underſtands the heels well.

To ride a horſe from one heel to another, is make him go ſideways, ſometimes to one heel, and ſometimes to another.

HEEL, in the ſea-language. If a ſhip leans on one ſide, whether ſhe be aground or a-float, then it is ſaid ſhe heels a-ſtarboard, or a-port; or that ſhe heels offwards, or to the ſhore; that is, inclines more to one ſide than to another.

HEEL *of the maſt*, that part of the foot of any maſt, which is pared away ſlanting on the aftward ſide thereof, in order that it may be ſtayed aftward on. The heels of the top-maſts are ſquares.

HEELER, or *Bloody* HEEL-*cock*, a fighting cock that ſtrikes or wounds much with his ſpurs.

The maſters know ſuch a cock even while a chicken, by the ſtriking of his two heels together in his going.

HEGIRA, in chronology, a celebrated epocha among mahometans. See the article EPOCHA.

The event which gave riſe to this epocha was the flight of Mahomet from Mecca, with his new proſelytes, to avoid the perſecution of the coraiſchites; who, being then moſt powerful in the city, could not bear that Mahomet ſhould aboliſh idolatry, and eſtabliſh his new religion. This flight happened in the fourteenth year after Mahomet had commenced prophet: he retired to Medina, which he made the place of his reſidence.

The mahometans have many fabulous traditions concerning this flight of their falſe prophet from Mecca to Medina: Having taken a reſolution, ſay they, to leave the city, he went out one night, being the firſt of the moon, accompanied only by Abubeker, his father-in-law, and paſſed the night in a grotto, diſtant an hour's journey from Mecca. As ſoon as

Fig. 1. HEIGHTS & DISTANCES.

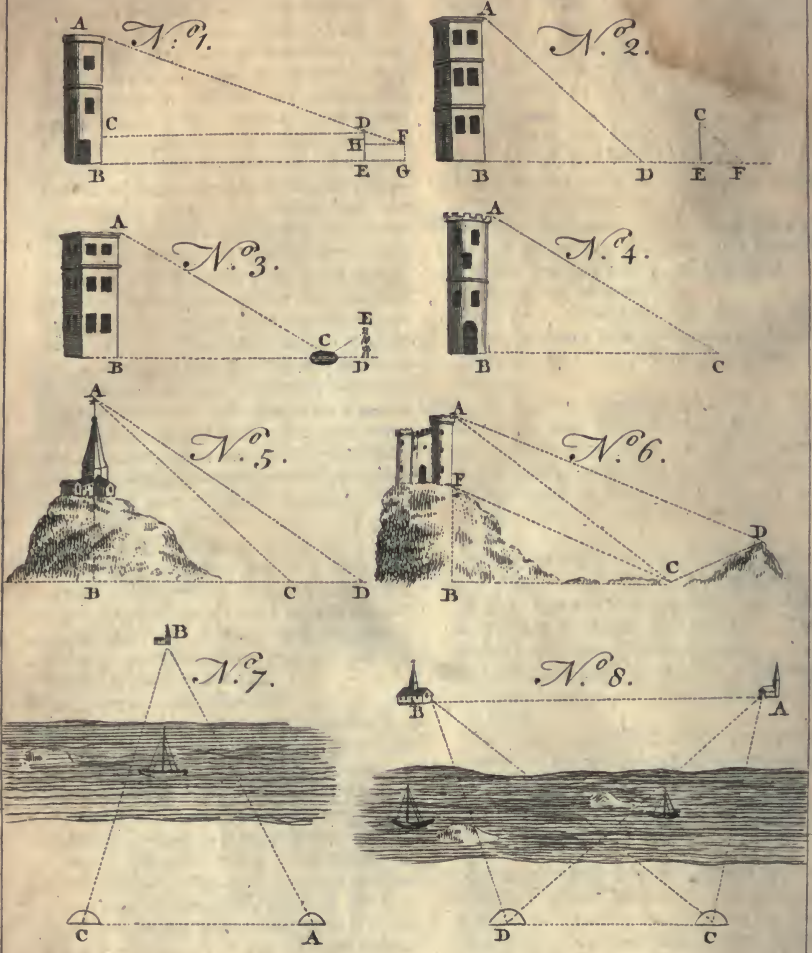


Fig. 3. HEXAGON.

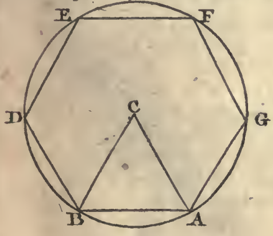
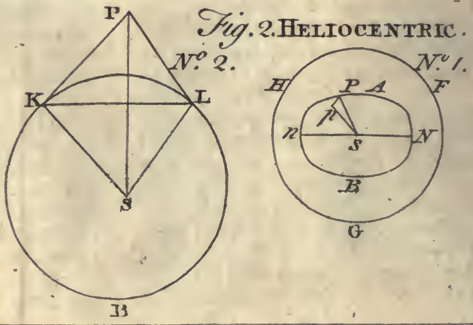


Fig. 2. HELIOCENTRIC.



T. Jefferys Sculp.t

as his retreat was known in the city, the coraiſchites, his declared enemies, went in purſuit of him, and arrived at the entrance of the grotto early the next morning: but that ſame night a large tree had grown up, at the mouth of the cave, in which the prophet was concealed; and what opening was left, was covered over with a ſpider's web; this being a plain indication, that nobody was in the cave, the coraiſchites went away, and Mahomet eſcaped the purſuit of his enemies.

HEIDELBURG, a city of Germany, in the circle of the lower Rhine, the capital of the palatinate, ſituated on the river Neckar: eaſt long. 8° 40′, and north lat. 49° 20′.

HEIGHT, *altitudo*, in geometry, is a perpendicular let fall from the vertex, or top, of any right-lined figure, upon the baſe or ſide ſubtending it. It is likewiſe the perpendicular height of any object above the horizon; and is found ſeveral ways, by two ſtaffs, a plain mirrour, with the quadrant, theodolite, or ſome graduated inſtrument, *&c.*

The meaſuring of heights or diſtances is of two kinds: when the place or object is acceſſible, as when you can approach to its bottom; or inacceſſible, when it cannot be approached.

Prob. I To meaſure an acceſſible height A B, by means of two ſtaffs. See plate CXXIX. fig. 1. n° 1.

Let there be placed perpendicularly in the ground, a longer ſtaff D E, likewiſe a ſhorter one F G, ſo as the obſervator may ſee A, the top of the height to be meaſured, over the ends D, F, of the two ſtaffs; let F H and D C, parallel to the horizon, meet D E and A B in H and C: then the triangles F H D, D C A, ſhall be equiangular; for the angles at C and H are right ones: likewiſe the angle A is equal to F D H; wherefore the remaining angles are alſo equal. Therefore as F H, the diſtance of the two ſtaffs, is to H D, the exceſs of the longer ſtaff above the ſhorter; ſo is D C, the diſtance of the longer ſtaff from the tower, to C A, the exceſs of the height of the tower above the longer ſtaff: and thence C A will be found by the rule of three. To which if the length D E be added, you will have the whole height of the tower B A.

Scholium. Another method may be occaſionally contrived for meaſuring an acceſſible height, as by the given length of the ſhadow B D (*ibid.* n° 2.) I find out the height A B: for let there be erected a ſtaff C F, perpendicularly, producing the ſhadow E F: then it will be as E F, the ſhadow of the ſtaff, is to E C, the ſtaff itſelf; ſo is B D, the ſhadow of the tower, to B A, the height. Though the plane on which the ſhadow of the tower falls, be not parallel to the horizon, if the ſtaff be erected in the ſame plane, the rule will be the ſame.

Prob. II. To meaſure an acceſſible height by means of a plain mirrour.

Let A B (*ibid.* n° 3) be the height to be meaſured; let the mirrour be placed at C, in the horizontal plane B D, at a known diſtance B C: let the obſerver go back to D, till he ſee the image of the ſummit in the mirrour, at a certain point of it, which he muſt diligently mark; and let D E be the height of the obſerver's eye. The triangles A B C and E D C, are equiangular; for the angles at D and B are right angles; and A C B, E C D, are equal, being the angles of incidence and reflection of the ray A C; wherefore the remaining angles at A and E, are alſo equal. Therefore it will be as C D is to D E; ſo is C B to B A.

Note 1. The obſerver will be more exact, if, at the point D, a ſtaff be placed in the ground perpendicularly, over the top of which the obſerver may ſee a point of the glaſs exactly in a line betwixt him and the tower.

Note 2. In place of a mirrour may be uſed the ſurface of water, which naturally becomes parallel to the horizon.

Prob. III. To meaſure an acceſſible height by the geometrical quadrant, theodolite, *&c.*

Let the angle C (*ibid.* n° 4.) be found. Then in the triangle A B C, right-angled at B (B C being ſuppoſed the horizontal diſtance of the obſerver from the tower) having the angle C, and the ſide B C, the required height will be found by the firſt caſe of plain trigonometry. Thus, ſuppoſe the angle C, 37° 24′, and the horizontal diſtance, B C 116, then the proportion will be as R : T. ∟ C : : C B : B A, the height.

The tangent altitude 37° 24′		9.88341
Log. C B 116	—	2.06446
	Added	11.94787
	Radius	10.00000
Height of the object A B 88.69		1.94787

Suppoſing the obſervation made on the top of the tower, and the height of the tower to be known, to find the diſtance of any object on the plane below; it is only the converſe of the former caſe.

You may alſo, having the baſe and angles, eaſily find the hypothenuſe A C, or how far it is from the top of the tower to the ſtation, by the ſecond caſe of right angled triangles: and it is uſeful in many caſes.

Prob. IV. To meaſure an inacceſſible height by the geometrical quadrant, *&c.* at two ſtations.

Let the angle A C B be obſerved (*ibid.* n° 5.) then let the obſerver go from C, to the ſecond ſtation D, in the right line B C D; and after meaſuring this diſtance C D, take the angle A D C likewiſe with the quadrant. Then in the triangle A C D, which is formed by the two viſual rays A D, A C, and the diſtance of the two ſtations D and C, there is given the angle A D C, with the angle A C D, becauſe the angle A C B was given before: therefore the remaining angle C A D is given likewiſe. But the diſtance of the ſtations C and D is alſo given; therefore by the ſecond caſe of oblique-angled trigonometry, the ſide A C will be found. Wherefore in the right-angled triangle A B C, all the angles and hypothenuſe A C are given; conſequently by the third caſe of plain trigonometry, the height ſought, A B, may be found; as alſo the diſtance of the ſtation C, from A B, the perpendicular within the hill or inacceſſible height.

Example. Suppoſe the angle at C, 43° 30′, and the angle at D 32° 12′, and the diſtance C D, betwixt the two ſtations, 112 feet; then the angle D A C will be 11° 18′, and the angle C A B 46° 30′. Hence for C A, the proportion will be as S. ∠ D A C : D C : : S. ∠ D : C A.

The log. D C 112	—	2,04922
Sine ∠ D 32° 12′	—	9.72663
Added		11.77585
S. ∠ D A C 11° 18′	—	9.29214
C A = 304.6	— —	2.48371

Then for A B, the height of the object, it will be as R : S. ∠ A C B : : C A : A B.

As radius	— —	10.00000
is to the ſine of 43° 30′	—	9.83781
ſo is C A 304.6	—	2.48371
to A B 209.7	— —	2.32152

Laſtly, for C B, the diſtance of the object from the neareſt ſtation, it will be as R : S. ∠ C A B : : C A : B C.

As radius	— —	10.00000
is to the ſine of C A B 46° 30′		9.86056
ſo is C A 304.6	—	2.48371
to B C 221	— —	2.34427

If the height of the tower is wanted, the angle B C F (*ibid.* n° 6.) may be found with the quadrant, which being taken from the angle A C B already known, the angle A C F will remain; but the angle F A C was known before; therefore the remaining angle A F C will be known. But the ſide A C was ſuppoſed found by the laſt problem; therefore in the triangle A F C, all the angles, and one of the ſides A C being known A F the height of the tower above the hill may be found by trigonometry.

Prob. V. To meaſure the diſtance of two places A and B, of which one, A, is acceſſible, by the theodolite, *&c. ibid.* n° 7.

Let there be erected at two points, A and C (ſufficiently diſtant) viſible ſigns; then let the two angles B A C, B C A, be taken by the theodolite. Let the diſtance of the ſtations A and C be meaſured with a chain. Then the third angle being known, and the ſide A C; therefore, by the ſecond caſe of oblique trigonometry, the diſtance required A B, will be found.

Prob. VI. To meaſure, by the theodolite, *&c.* the diſtance of two places, neither of which is acceſſible. *ibid.* n° 8.

Let two ſtations C and D be choſen, from each of which the places may be ſeen whoſe diſtance is ſought: let the angles A C D, B C D, and likewiſe the angles B D C, B D A, C D A, be meaſured by the theodolite, *&c.* the diſtance of the ſtations C and D be meaſured by a chain, or, if neceſſary, by the laſt problem. Now in the triangle A C D, there are given two angles A C D and A D C; therefore the third C A D is likewiſe given: moreover the ſide C D is given; therefore by the ſecond caſe of oblique trigonometry, the ſide A D will be found. After the ſame manner, in the triangle B C D, from all the angles, and one ſide C D given, the ſide B D is found. Wherefore in the triangle A D B, from the given ſides D A and D B, and the angle A D B contained by them, the ſide A B (the diſtance ſought) is found to be the fourth caſe of oblique angled trigonometry. Note, That it is not neceſſary that the points A, B, C, and D be in one plane, and that any triangle is in one plane.

HEILA, a port-town of regal Pruſſia, in the kingdom of Poland, ſituated on the point of the peninſula in the Baltic-ſea, twelve miles north of Dantzick: eaſt long. 19°, north lat. 54° 30′.

HEINUSE, among hunters, a roe-buck of the fourth year.

HEIR, *hæres*, in law, ſignifies the perſon who ſucceeds another by deſcent to lands, tenements, and hereditaments, being an eſtate of inheritance, or an eſtate in fee; becauſe nothing paſſes by right of inheritance but in fee.

Where there is a grandfather, father and ſon, if the father die before the grandfather, who afterwards dies ſeiſed in fee, the land, in that caſe, ſhall go to the eldeſt grandſon, and not to any other children of the grandfather. On the father's dying without iſſue, &c. the next eldeſt brother ſhall have the lands, &c. as heir; and for want of a brother, they deſcend to the father's ſiſters. A man has iſſue only a daughter, and dies leaving his wife with child of a ſon, who is afterwards born; here the ſon, after his birth, is heir; however, in the mean time, the daughter is to have the land. Yet there are ſome perſons diſqualified from being heirs, as a baſtard, an alien, one attainted of treaſon or felony, &c. but idiots and lunatics, perſons excommunicated, or that are attainted in a premunire, and out-laws in debt, &c. are capable of being heirs.

The word heir is a collective term, and extend to all heirs, under which the heirs of heirs are comprehended; as where lands are given to a perſon and his heirs, all his heirs are thereby totally in him. The heir is favoured by common law: for not only land, but rent not due and in arrear at the death of the anceſtor, ſhall go to the heir; ſo corn ſown by a tenant for years, where his term expires before his corn is ripe, and every thing faſtened to the freehold, timber-trees, deeds belonging to the inheritance, deer, conies, pigeons, fiſh, &c. go to the heir. Where an anceſtor has bound himſelf and his heirs for the payment of money, or performance of ſome other act, the heir, tho' never ſo much land comes to him from ſuch anceſtor by gift in tail, or other ſuch conveyance of the father, and not by deſcent, is no way chargeable; and it is likewiſe ſo in all other eſtates, except fee ſimple. If land be granted to a perſon and his heirs during the life of another, &c. the heir ſhall not be charged for this, no more than for lands intailed. The heir's body ought not to be taken in execution for the debt of his anceſtor, nor any other lands but thoſe he received in the caſe of deſcent: and whether an heir has land by deſcent or not, he is triable by a jury, who are to aſcertain the value of the lands deſcended, in order to make the heir anſwerable. A creditor may ſue either the heir, executor, or adminiſtrator, each of whom are chargeable; as is alſo a collateral heir, but in that caſe he muſt be ſpecially charged as ſuch: but where an heir, on being ſued, pays his anceſtor's debts, he ſhall be reimburſed by the executor of ſuch anceſtor, if he has aſſets in his hands. The heir has this advantage, that he can force the adminiſtrator to pay debts out of the perſonal eſtate of the inteſtate, in order to preſerve the inheritance free; and where an executor has aſſets, the heir may in equity compel him to redeem a mortgage.

HEIR-APPARENT, is a perſon ſo called in the lifetime of his anceſtor, at whoſe death he is heir at law.

HEIRESS, a female heir to one who has an eſtate in lands, &c. Stealing an heireſs, and marrying her againſt her will, was declared felony by 3 Hen. VII.

HEIR-LOOME, is a word that comprehends in it divers pieces of furniture; as the firſt bed, and other things, which by the cuſtom of ſome places have belonged to a houſe for ſeveral deſcents. Theſe are never inventoried after the death of the owner as chattles, and therefore do not go to the executor or adminiſtrator, but to the heir along with the houſe, by cuſtom, and not by common law.

Heir-loomes are not deviſeable by will, for cuſtom veſts them in the heir before a deviſe: yet a ſale thereof in the perſon's lifetime might make it otherwiſe.

HELEGUG, in ornithology, a name given to the arctic duck of Cluſius.

HELENA, or *St.* HELENA, an iſland in the Atlantic ocean, ſituated 1200 miles weſt of the coaſt of Africa, and 1800 eaſt of the coaſt of South America: weſt long. 6° 13′, ſouth lat. 16°.

It is about twenty-one miles round, and conſiſts of one ſteep rock, which looks like a caſtle in the middle of the ſea, and which is covered with about a foot of vegetable earth, that produces corn, grapes, and almoſt all manner of fruits and vegetables: but the corn is generally eaten up by the rats, and the country is too hot to make wine. It has but one landing place, which is defended by a platform, and a fort in which the governor reſides. It is ſubject to the engliſh Eaſt-India company, by whoſe aſſiſtance it was planted, after it was taken from the Dutch in the reign of king Charles II.

St. **Helena's day**, a feſtival in the romiſh church on the 18th of Auguſt. This ſaint was the empreſs Helena, daughter of the emperor Conſtantine, who, it is ſaid, diſcovered the croſs of Chriſt after it had been long buried in the ground.

Helena, in aſtronomy. See the article Castor.

HELENIA, or Heleniastrum, bastard-elecampane, in botany, a genus of the ſyngeneſia-polygamia-ſuperflua claſs of plants, the compound flower of which is radiated, and conſiſts of a multitude of hermaphrodite and female ones, the former on the diſk, and the latter on the verge. The hermaphrodite flowers are tubular, and quinquedentated at the limb; whereas the female ones are linear, ligulated, and trifid at the point. The ſtamina are five ſlender and very ſhort filaments; and the ſeed which is ſingle, is contained in the cup.

HELENIUM, elecampane, in botany, *&c.* is ranked by Linnæus among the ſtar-worts. See the articles Aster and Elecampane.

HELEPOLIS, in the antient art of war, a machine for battering down the walls of a place beſieged, the invention of which is aſcribed to Demetrius, the Poliorcete.

Diodorus Siculus ſays, that each ſide of the helepolis was 405 cubits broad, and 90 in height; that it had nine ſtages, and was carried on four ſtrong ſolid wheels eight cubits in diameter; that it was armed with large battering rams, and had two roofs capable of ſupporting them; that in the lower ſtages there were different ſorts of engines for caſting ſtones; and in the middle they had large catapultas for lancing arrows, and ſmaller in thoſe above, with a number of expert men for working all theſe machines.

HELIACAL, in aſtronomy, a term applied to the riſing or ſetting of the ſtars, or, more ſtrictly ſpeaking, to their emerſion out of and immerſion into the rays and ſuperior ſplendor of the ſun.

A ſtar is ſaid to riſe heliacally, when after having been in conjunction with the ſun, and on that account inviſible, it comes to be at ſuch a diſtance from him, as to be ſeen in the morning before ſun-riſing; the ſun, by his apparent motion, receding from the ſtar towards the eaſt; on the contrary, the heliacal ſetting is when the ſun approaches ſo near a ſtar, as to hide it with his beams, which prevent the fainter light of the ſtar from being perceived, ſo that the terms apparition and occultation would be more proper than riſing and ſetting.

All the fixed ſtars in the zodiac, as alſo the ſuperior planets, mars, jupiter, and ſaturn, riſe heliacally in the morning, a little before ſun-riſing, and a few days after they have ſet coſmically. Again, they ſet heliacally in the evening, a little before their achronycal ſetting. But the moon, whoſe motion eaſtward is always quicker than the apparent motion of the ſun, riſes heliacally in the evening, after the new moon; and ſets heliacally in the morning, when old and approaching to a conjunction with the ſun.

The inferior planets, venus and mercury, which ſometimes ſeem to go weſtward from the ſun, and ſometimes again have a quicker motion eaſtward, riſe heliacally in the morning, when they are retrograde; but when direct in their motions, they riſe heliacally in the evening. The heliacal riſing or ſetting of the moon happens when ſhe is 17° diſtant from the ſun; but for the other planets, 20° are required; and for the fixed ſtars, more or leſs according to their magnitude.

HELIÆA, ἡλιαια, in grecian antiquity was the greateſt and moſt frequente court in Athens for the trial of civi affairs. The judges who ſat in it, wer at leaſt fifty, but the more uſual numbe was either two or five hundred. Whe cauſes of great moment were to be tried it was cuſtomary to call in the judges o the other courts: ſometimes a thouſan were called in, and then two courts ar ſaid to have been joined: ſometimes fif teen hundred or two thouſand were call ed in, and then three or four courts me together.

They had cognizance of civil affairs o the greateſt weight and importance, an were not permitted to give judgment ti they had taken a ſolemn oath to do it wit impartiality, and to give ſentence accord ing to the laws, *&c.*

HELIANTHUS, *the* great sun-flow er, in botany, a genus of the ſyngeneſia polygamia-fruſtranea claſs of plants, t compound flower of which is radiate with a multitude of cylindraceous he maphrodite flowers on the diſc, and a fe very long ligulated female ones: the ſt mina are five filaments; and the ſee

a

are ſingle, and contained in the cup. The flowers are yellow, and often more than a foot in diameter.

HELIASTES, in antiquity, one of the judges of the court of heliæa. See the article HELIÆA.

HELICTERES, the SCREW-TREE, in botany, a genus of the gynandria-decandria claſs of plants, the flower of which conſiſts of five oblong petals, equal in breadth; and the fruit is compoſed of five unilocular capſules, containing a great many kidney-ſhaped ſeeds, and twiſted ſpirally about one another.

HELIOCARPOS, in botany, a genus of the polyandria-digynia claſs of plants, the flower of which conſiſts of four linear petals, conſiderably ſhorter and narrower than thoſe of the cup: the fruit is a pedunculated, bilocular capſule, of a turbinated oval figure, containing ſingle ſeeds of an oval ſhape.

HELIOCENTRIC *latitude of a planet*, the inclination of a line drawn between the center of the ſun and the center of a planet, to the plane of the ecliptic, which may be thus determined.

If the circle F G H (plate CXXIX. fig. 2. n° 1.) repreſent the orbit of the earth round the ſun, and the inner one, A N B *n*, be ſo placed as to incline to the plane of the other; (on which account it appears in the form of an ellipſis) then when the planet is in the node *n*, it will appear in the ecliptic, and ſo have no latitude. But if it move to P, then, being ſeen from the ſun, it will appear to decline from the ecliptic, or to have latitude; and the inclination of the line S P to the plane of the ecliptic, is called the planet's heliocentric latitude; the meaſure of which is the angle P S *p*, ſuppoſing the line P *p* to be perpendicular to the plane of the ecliptic.

This heliocentric latitude will be continually increaſing till the planet come to the point A, which they call the limit, or utmoſt extent of it; and then it will decreaſe again, till it reach the other node N, when it will have no latitude; after which it will increaſe again, till it come to B, or its utmoſt latitude; and, laſtly, decreaſe again, till the planet come to be in *n*, whence it ſet out.

HELIOCENTRIC *place of a planet*, in aſtronomy, the place of the ecliptic wherein the planet would appear to a ſpectator placed at the center of the ſun.

The ingenious Dr. Halley gives the following method to find the heliocentrical places of a planet, and its diſtances from the ſun, which ſuppoſes only that the periodical time of the planet is known. Let K L B (*ibid.* n° 2.) be the orbit of the earth, S the ſun, P the planet, or rather the point in the plane of the ecliptic, in which the perpendicular let fall from the planet meets that plane. And firſt when the earth is in K, obſerve the geocentric longitude of the planet, and having the theory of the earth, we have the apparent longitude of the ſun, and conſequently, the angle P K S. The planet, after it has completed an entire revolution, returns again to the point P, at which time ſuppoſe the earth in L; and there again, let the planet be obſerved, and find the angle P L S, the planet's elongation from the ſun. Having the times of obſervations, we have the places of the earth in the ecliptic, or the points K and L; and, conſequently, the angle L S K, and the ſides L S and S K: wherefore we ſhall have the angles S K L and S L K, and the ſide L K. From the known angles S K P and S L P, take away the known angles S K L and S L K, and we ſhall have the angles P K L and P L K known; therefore in the triangle P L K, having all the three angles, and the ſide L K, we ſhall find the ſide P L; and in the triangle P L S, having the ſides P L and L S, and the intercepted angle P L S, we ſhall have the angle L S P, which determines the heliocentric place, and its diſtance from the node according to the ecliptic, as alſo the ſide S P. But as the tangent of the geocentric latitude is to the tangent of the heliocentric, ſo is the curtate diſtance of the planet from the ſun, to its curtate diſtance from the earth. But as the geocentric latitude may be found by obſervation, the heliocentric latitude will alſo be found; by which, and the curtate diſtance of the planet from the ſun, we can find the true diſtance.

HELIOCOMETES, a phænomenon ſometimes obſerved about ſun-ſetting; being a large luminous tail, or column of light, proceeding from the body of the ſun, and dragging after it, not unlike the tail of a comet; whence the name.

HELIOSCOPE, in optics, a ſort of teleſcope, peculiarly fitted for viewing the ſun, without hurting the eyes. See the article TELESCOPE.

As the ſun may be viewed through coloured glaſſes, without hurt to the eyes, if the object and eye-glaſſes of a teleſcope be made of coloured glaſs, as red or green, ſuch a teleſcope will become an helioſcope.

But Mr. Huygens only uſed a plain glaſs, blacked at the flame of a candle on one ſide, and placed between the eye-glaſs and the eye; which anſwers the deſign of an helioſcope very well.

HELIOSTATA, in optics, an inſtrument invented by the late learned Dr. 'S Graveſande; who gave it this name, from its fixing, as it were, the rays of the ſun in an horizontal direction acroſs the dark chamber, all the while it is in uſe.

This inſtrument is an automaton, or piece of clock-work, whoſe parts are as follows. A A (plate CXXX.) is a frame in which a metalline ſpeculum S is ſuſpended, moveable about its axis by means of two ſmall ſcrews *a*, *a*. This frame is fixed to the piece C, which being hollow, is moveable upon the cylindric ſhaft P. This pillar is fixed on a triangular baſe or foot ſet perpendicular, by the three ſcrews B, B, B.

On the back part of the ſpeculum is fixed a long cylindric wire, or tail D, in a perpendicular poſition. By this it is connected to the ſecond part of the helioſtata, which is a common thirty-four hour clock, repreſented at H, the plane of which clock is ſet parallel to that of the equator in any given place. The clock is ſuſtained on the column F G, in which it is moveable up and down by a thin lamina or plate that enters it as a caſe, and fixed by a proper height by two ſcrews *d*, *d*, at the ſide. The whole is truly adjuſted to a perpendicular ſituation by means of the three ſcrews I, I, I, in the tripod L, L, M, and the plummet Q, whoſe capſis muſt anſwer to the point *o* beneath.

The axis of the wheel which moves the index N O, over the hour circle, is ſomewhat large, and perforated with a cylindric cavity approaching a little to a conical figure; and receives the ſhank of the ſaid index N O very cloſe and tight, that by its motion the index may be carried round. In the extremity, O, of the index is a ſmall cylindric piece, with a cylindric perforation to receive the tail *t* of the fork T, yet ſo as to admit a free motion therein. In each ſide of the fork are ſeveral holes exactly oppoſite to each other, in which go the ſcrews *r*, *r*, upon whoſe ſmooth cylindric ends moves the tubular piece R,

When the machine is to be fixed for uſe, another part is made uſe of to adjuſt it; which is called the poſitor, and is denoted by the letters V X Y Z.

The cylinder C is removed with a ſpeculum from the foot P, and the braſs column V X put on in its ſtead, and adheres more ſtrictly to the pin *e*, that it may keep its poſition while the machine is conſtituted.

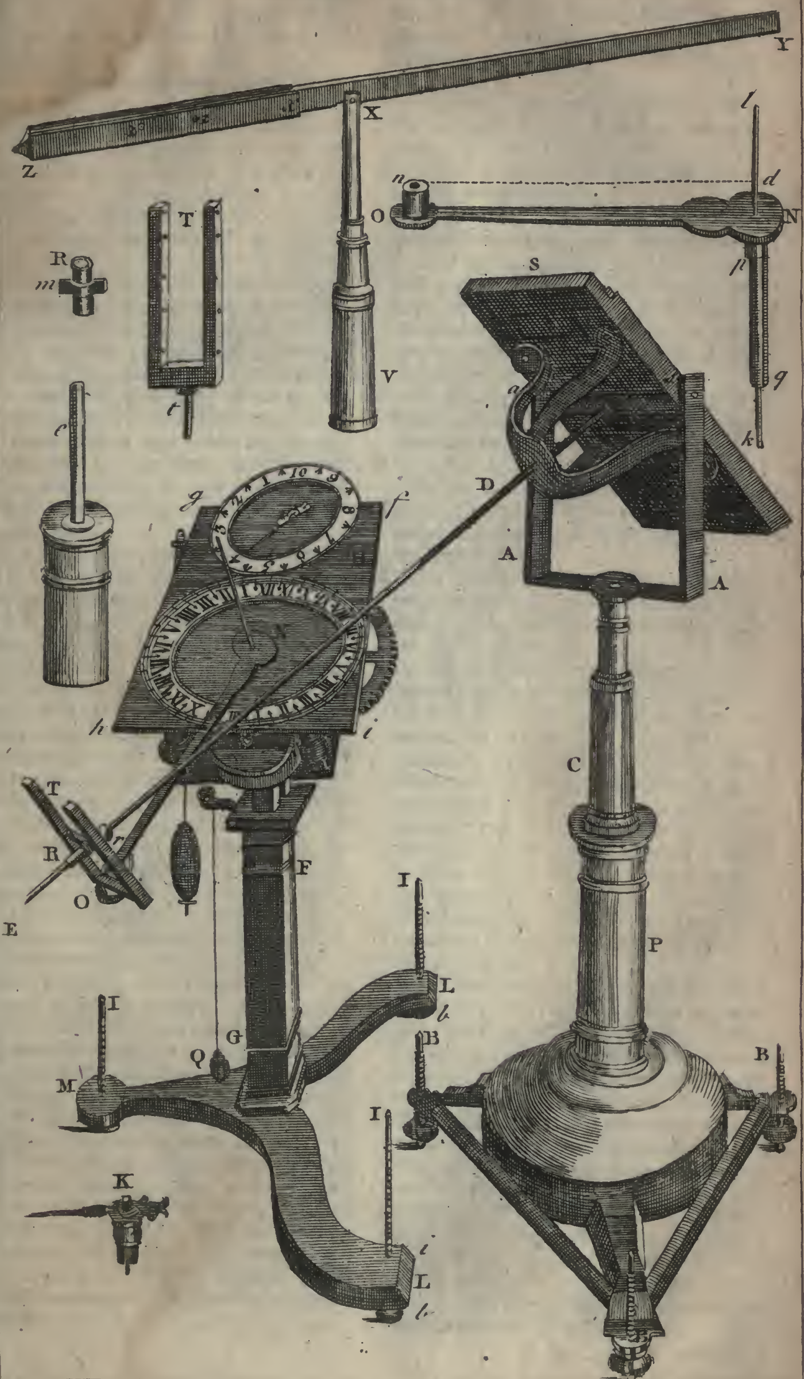
On the top of the column, about X as a center, moves the lever Y Z, ſo that it may be any how inclined to the horizon, and keep its poſition. The arm Y X may be of any length at pleaſure; but the arm X Z is of a peculiar conſtruction, and of a determinate length. To this arm, which extends no farther than *y*, is a ſliding-piece Z *x*, ſharp pointed at Z. By this the arm X Z is determined to a given length, the piece Z *x* being fixed by the ſcrews *z z*. Upon this arm is drawn the ſhort line *v x*, by which it may be lengthened in the whole, and is $\frac{9}{100}$ of the whole length X Z, when ſhorteſt. The reaſon is, this arm is always to increaſe and decreaſe in proportion to the ſecant of the ſun's declination to the radius X Z, when ſhorteſt; but the radius is to the ſecant of 23° 30′ (the ſun's greateſt declination) as 10000000 to 10904411, or as 100 to 109. Now the reaſon of this conſtruction of the arm X Z, is to find for any given day the diſtance of the center of the ſpeculum S from the top *l* of the ſtyle *l* N, which muſt ever be equal to the ſecant of the ſun's declination; for it muſt always be equal to the diſtance of the top of the ſaid ſtyle, *l*, from the center of the cylinder R in the fork T, and that is always equal to the ſaid ſecant of declination.

For ſince the ſtyle *l* N and the fork T are in a poſition parallel to each other, therefore the middle hole in the ſides of the fork being (as they muſt be) of the ſame height above the end of the index O, as is the height of the ſtyle N *l*, it is evident that on an equinoctial day the ſun's rays will paſs directly through the perforation of the piece R, if it be put in a poſition parallel to the plane of the ecliptic, or that of the clock; and alſo that the top of the ſhadow of the ſaid ſtyle will fall exactly on the ſaid hole.

In this caſe the top of the ſtyle is at the leaſt diſtance from the central point of R, and therefore may be repreſented by radius; while in any other poſition above or below, the diſtance will increaſe in propor-

tion

HELIOSTATA.



T. Jefferys Sculp.t

tion to the ſecant of the angle which the rays make with this firſt or middle ray, that paſs by the top of the ſtyle, and through the hole R.

Now it may be demonſtrated, that on any day of the year, if the clock and its pedeſtal be ſo fixed that the line of XII be exactly in the meridian, and that the poſition of R in the fork be ſuch that the ſun's rays go directly through it, and the ſhadow of the ſtyle's top fall juſt upon the hole; moreover, if the diſtance of the center of the ſpeculum S from the top of the ſtyle *l* be made equal (by the poſitor) to the diſtance of the central point of R therefrom; and, laſtly, the tail of the ſpeculum DE paſſing through R; then if the clock be put into motion, the index N O ſhall carry about the tail of the ſpeculum in ſuch a manner, that at all times of that day, when the ſun can come upon the ſpeculum, it will reflect the rays conſtantly in one and the ſame poſition and direction all the time without variation.

The machine thus conſtituted, is placed in a box or caſe, and ſet in a window with one ſide open, expoſed to the ſun, and all the other parts cloſe; ſo that when the room is made dark, and the ſolar microſcope fixed to the fore-part of the box in which the helioſtata is placed, juſt againſt the center of the ſpeculum to receive the reflected horizontal beam, all the experiments of the darkened room are then performed as uſual.

This is a very ingenious conſtruction of a ſolar microſcope-apparatus, but, we fear, too expenſive and troubleſome for common uſe. However, it is eaſy to ſee that this machine is capable of being greatly reduced; ſince it may be made to anſwer the end very well without a clock and the ſpeculum may be glaſs inſtead of metal, and all fixed in one pedeſtal. See the article MICROSCOPE.

HELIOTROPE, *heliotropium*, in botany, a genus of the pentandria-monogynia claſs of plants, the corolla of which conſiſts of a ſingle petal; the tube is of the length of the cup; the limb is plane, divided lightly into five ſegments, and obtuſe; the ſmaller ſegments ſtand alternate, and are acute; the large are placed between; the mouth is cloſed by five prominent ſquamulæ, which bending toward one another, form a little ſtar: there is no pericarpium; the calyx remains unaltered, and contains four oval acuminated ſeeds.

A decoction of this plant purges phlegm and bile. It is good againſt the ſting of ſerpents: it conſumes warts, and provokes the menſes, and the expulſion of the fœtus.

HELIOTROPE, in foſſil hiſtory, a hard bluiſh-green jaſper, with red variegations. See the article JASPER.

HELIX, in geometry, the ſame with ſpiral. See the article SPIRAL.

In architecture ſome authors make a difference between the helix and the ſpiral. A ſtair caſe according to Daviler, is an helix, or is helical, when the ſtairs or ſteps wind round a cylindrical newel; whereas the ſpiral winds round a cone, and is continually approaching nearer and nearer its axis.

HELIX alſo ſignifies the caulicoles, or little volutes, under the flower of the corinthian capital, called alſo urillæ.

HELIX, in anatomy, is the whole circuit or extent of the auricle outwards, in oppoſition to which the inner protuberance anſwering thereto, is called anthelix. See the article EAR.

HELL, *gehenna, tartara, hades, infernus,* &c. the place of divine puniſhment after death, in contradiction to heaven. See the article HEAVEN.

As all religions have ſuppoſed a future ſtate of exiſtence after this life, ſo all have their hell or place of torment, in which the wicked are ſuppoſed to be puniſhed. The hell of the antient heathens was divided into two manſions, the one called elyſium, on the right hand, pleaſant and delightful, appointed for the ſouls of good men; the other called tartara, on the left, a region of miſery and torment, appointed for the wicked. The latter was only hell in the preſent reſtrained ſenſe of the word. See the article ELYSIUM.

Of all the poets of antiquity, Virgil is the moſt particular in his deſcription of hell; having carried his hero thither, and given him a full view of theſe infernal regions: for an account of which we muſt refer the reader to the ſixth Æneid of that poet, where the many dreadful apparitions, as gorgons, harpies, chimæras, and the like, are ſtrongly painted, and a deſcription of Charon, the old ferryman of hell, his buſineſs, together with the officer of Minos and Radamanthus, two of the judges of hell, are very lively repreſented. The opening of the adamantine gate, diſcovers to Æneas the inmoſt receſſes of tartara, or hell, which according to the poet is twice as deep as the earth is diſtant from the ſkies. Here Æneas ſees various perſons condemned to puniſhment, as alſo the different kinds and forms of torture which are ſo numerous, that the poet concludes, *non mihi ſi linguæ centum*, &c.

"Had I an hundred mouths, an hun-
"dred tongues,
"And throats of braſs inſpired with
"iron lungs,
"I could not half theſe horrid crimes
"repeat,
"Nor half the puniſhments theſe crimes
"have met." *Dryden.*

The antient philoſophers were of opinion, that the infernal regions were at an equal diſtance from all the parts of the earth; nevertheleſs it was the opinion of ſome, that there were certain paſſages which led thither, as the river Lethe, near the Syrtes, and the acheruſian cave in Epirus. At Hermione it was thought, that there was a very ſhort way to hell; for which reaſon, the people of that country never put the fare into the mouths of the dead to pay their paſſage. Ulyſſes, according to Homer, went by ſea to the country of the Cimmerians, in order to go thither; and Æneas went by the lake of the cave of Avernus.

The Jews placed hell in the center of the earth, and believed it to be ſituated under waters and mountains. According to them there are three paſſages leading to it: the firſt is in the wilderneſs, and by that Korah, Dathan and Abiram deſcended into hell; the ſecond is in the ſea, becauſe Jonah, who was thrown into the ſea, cried to God out of the belly of hell; the third is in Jeruſalem, becauſe it is ſaid the fire of the Lord is in Zion, and his furnace is in Jeruſalem. They likewiſe acknowledged ſeven degrees of pain in hell, becauſe they find this place called by ſeven different names in ſcripture. Though they believed that infidels, and perſons eminently wicked, will continue for ever in hell; yet they maintained, that no Jew, who is not infected with ſome hereſy, and has not acted contrary to the points mentioned by the Rabbins, will be puniſhed therein for any other crime above a year at moſt.

The mahometans believe the eternity of rewards and puniſhments in another life. In the Koran it is ſaid, that hell has ſeven gates, the firſt for the Muſſulmans, the ſecond for the Chriſtians, the third for the Jews, the fourth for the Sabians, the fifth for the Magians, the ſixth for the Pagans, and the ſeventh for the hypocrites of all religions.

Among Chriſtians, there are two controverted queſtions in regard to hell, the one concerns locality, the other the duration of its torments. The locality of hell, and the reality of its fire, began firſt to be controverted by Origen. That father interpreting the ſcripture account metaphorically, makes hell to conſiſt not in external puniſhments, but in a conſciouſneſs or ſenſe of guilt, and a remembrance of paſt pleaſures. Among the moderns, Mr. Whiſton advanced a new hypotheſis. According to him the comets are ſo many hells appointed in their orbits alternately to carry the damned into the confines of the ſun, there to be ſcorched by its violent heat, and then to return with them beyond the orbit of ſaturn, there to ſtarve in theſe cold and diſmal regions. Another modern author not ſatisfied with any hypotheſis hitherto advanced, aſſigns the ſun to be the local hell. As to the ſecond queſtion, *viz.* the duration of hell torments, we have Origen again at the head of thoſe who deny that they are eternal; it being that father's opinion, that not only men, but devils, after a due courſe of puniſhment ſuitable to their reſpective crimes, ſhall be pardoned and reſtored to heaven. The chief principle upon which Origen built his opinion, was the nature of puniſhment, which he took to be emendatory, applied only as phyſic for the recovery of the patient's health. The chief objection to the eternity of hell torments among modern writers, is the diſproportion between temporary crimes and eternal puniſhments. Thoſe who maintain the affirmative, ground their opinions on the ſcripture accounts, which repreſent the pains of hell under the figure of a worm which never dies, and a fire which is not quenched; as alſo upon the words, "Theſe ſhall go away into everlaſting "puniſhment, but the righteous into "life eternal."

HELLEBORE, *helleborus*, in botany, a genus of the polyandria polygynia claſs of plants, with a roſaceous flower, compoſed of five or more roundiſh and large petals: the fruit is compoſed of ſeveral bicarinated capſules, containing a great number of roundiſh ſeeds. See plate CXXXI. fig. 1.

The root of this plant is the true black hellebore of the ſhops, which is a purge; but not a very ſafe one; being ſometimes given in ſubſtance from ten grains to twenty. In tincture, it is principally uſed as an alterative, for attenuating the humours. It has been always famous in maniac caſes, and is ſtill given in them, tho' rather as an alterative than a purge: for at preſent, the uſe of black hellebore as a purge is out of doors; the chemical preparations of antimony and mercury having been found much more certain, and to anſwer as well all its purpoſes. The doſe of the tincture is from 15 to 50 drops, which is given in hyſteric caſes, and obſtructions of the viſcera.

White HELLEBORE, in pharmacy, the root of the broad leaved veratrum. See the article VERATRUM.

White hellebore, given in powder or in infuſion, is a very rough vomit; and, at preſent, is never uſed but when very deſperate diſeaſes call for ſuch a remedy. It is a powerful ſternutatory, and is ſometimes uſed as ſuch in ſoporoſe diſeaſes; but the principal uſe made of it at preſent is externally, in unguents for the itch, among the common people.

HELLENISM, in matters of language, a phraſe in the idiom, genius, or conſtruction of the greek tongue.

This word is only uſed when ſpeaking of the authors who writing in a different language, expreſs themſelves in a phraſeology peculiar to the greek.

HELLENISTIC, or HELENISTIC LANGUAGE, that uſed by the grecian Jews who lived in Egypt and other parts where the greek tongue prevailed. In this language it is ſaid the Septuagint was written, and alſo the books of the New Teſtament; and that it was thus denominated to ſhew that it was greek filled with hebraiſms and ſyriaciſms.

HELLENODICÆ, in grecian antiquity, the directors of the olympic games. See the article OLYMPIC.

HELLESPONT the entrance of the ſtreights which divide Aſia from Europe, and paſs from the Archipelago to Conſtantinople. It is now called the Dardanels, and is about two miles wide.

HELM *of a ſhip*, is a piece of timber faſtened into the rudder, which comes forward into the ſteerage, or place where the perſon at the helm ſteers the ſhip, by holding the whipſtaff in his hand, which is joined to the helm. They begin however to be left off, ſteering-wheels being uſed in their room.

There are ſeveral terms in the ſea-language relating to the helm; as, *bear up the helm*; that is, let the ſhip go more large before the wind. *Helm a mid-ſhip*, or *right the helm*; that is, keep it even with the middle of the ſhip. *Port the helm*, put it over the left ſide of the ſhip. *Starboard the helm*, put it on the right ſide of the ſhip.

HELMET, an antient defenſive armour worn by horſemen both in war and in tournaments. It covered both the head and face, only leaving an aperture in the front ſecured by bars, which was called the viſor.

It is ſtill uſed in heraldry by way of creſt over the ſhield or coat of arms, in order to expreſs the different degrees of nobility, by the different manner in which it is borne. Thus a helmet in profile, is given to gentlemen and eſquires: to a knight, the helmet ſtanding forward and the beaver a little open: the helmet in profile and open, with bars, belongs to all noblemen under the degree of a duke: and the helmet forward and open, with many bars, is aſſigned to kings, princes, and dukes.

There is generally but one helmet upon a ſhield; but ſometimes there are two, and even three: if there be two, they ought to face each other; and if three, the middlemoſt ſhould ſtand directly forward, and the other two on the ſides facing towards it.

HELMINTHOLITHUS, in natural hiſtory, a name given by Linnæus to petrified bodies reſembling worms.

Of theſe he reckons four genera. 1. Petrified lithophyta, found in the mountains of Sweden. 2. Petrified ſhells. 3. Petrified zoophytes. 4. Petrified reptiles. See LITHOPHYTA, SHELL, &c.

HELMONT, a town of the Netherlands, in the province of dutch Brabant, ſituated on the river Aa: eaſt longitude 5° 40′, north latitude 51° 30′.

HELMSTAT, a town of Germany, in the circle of Lower Saxony, and dukedom of Brunſwic: eaſt long. 11° 15′, north lat. 52° 20′.

HELONIAS, in botany, a genus of the hexandria-trigynia claſs of plants, without any flower petals; the fruit is an oval berry, containing only one cell, in which is a ſingle oval ſeed.

HELOTS, in grecian antiquity, the inhabitants of Helos, a town of Laconia, conquered by the Spartans; who made them all priſoners of war, and reduced them into the condition of ſlaves.

The freemen of Sparta were forbidden the exerciſe of any mean or mechanical employment, and therefore the whole care of ſupplying the city with neceſſaries, devolved upon the Helots: the ground was tilled, and all ſorts of trade managed by them, whilſt their maſters, gentlemen like, ſpent their time in all ſorts of manly exerciſes. Notwithſtanding the great uſefulneſs of the Helots, they were treated in the moſt barbarous manner, and often murdered without any ſhew of juſtice. It was a thing common with the Spartans to force them to drink to exceſs, and then lead them in that condition into their public halls, that their children might ſee what a contemptible and beaſtly ſight a drunken man is. They made them dance uncomely dances, and ſing ridiculous ſongs; forbidding them expreſsly to uſe any that was ſerious and manly.

HELPS, in the manege. To teach a horſe his leſſon, there are ſeven helps or aids to be known: theſe are the voice, rod, bit or ſnaffle, the calves of the legs, the ſtirrups, the ſpur, and the ground.

The helps are occaſionally turned into corrections.

HELSINGFORD, a port-town of Sweden, ſituated on the gulph of Finland, in 24° 6′ eaſt long. and 60° 8′ north lat.

HELSINGIA, a province of Sweden, bounded by the Bothnic gulph on the eaſt, and by Delecarlia on the weſt.

HELSINGIC CHARACTER, a peculiar kind of character, found inſcribed on ſtones in the province of Helſingia: the runic and helſingic characters may be eaſily transformed into each other.

HELSTON, a borough of Cornwall, nine miles ſouth-weſt of Falmouth: it ſends two members to parliament.

HELVE, a term uſed among country people for the handle of a hatchet, pick-ax, mattock, or the like.

HELVETIC, ſomething belonging to Helvetia, or Switzerland. See the article SWITZERLAND.

HELVOETSLUYS, a port-town of the United Netherlands, ſituated in the iſland of Voorn, in the province of Holland, five miles ſouth of the Briel: it is one of the beſt harbours in Holland, and that to which the engliſh packet always goes.

HELXINE, BUCK-WHEAT, in botany, a genus of the octandria-trigynia claſs of plants, the corolla of which is permanent, and conſiſts of a ſingle petal, divided into five obtuſe, erecto-patent ſegments: there is no pericarpium, the corolla performs the office of it, and ſurrounds the ſeed, which is ſingle, triquetrous, and acute.

HEM, in the ovens for baking calamine, a partition which ſeparates the hearth from the oven itſelf: it is open at top, to let the flame paſs over to bake the calamine.

HEMERO-BAPTISTS, a ſect among the Jews, ſo called becauſe they waſhed themſelves every day, making holineſs to conſiſt in theſe daily ablutions.

They were phariſees in every thing, except that with the ſadducees, they denied a reſurrection. Probably theſe were the ſect who found fault with our Saviour's diſciples for eating with unwaſhen hands. D'Herbelot tells us, that the diſciples of St. John Baptiſt, who, in the firſt ages of of the church, were called hemero-baptiſts, and the number of whom is conſiderable among the Jews, have ſince that time formed a ſect, or rather religion apart, under the name of mendai jahia.

HEMEROBIUS, in zoology, a genus of inſects of the neureptera order, the characters of which are theſe: the palate is prominent, and has on each ſide two tentacula: the wings, being four in number, are deflex and tumid.

To this genus belong the golden-eye, a large beautiful fly, ſo called from the colour of its eyes; the formica-leo, and ſeveral other ſpecies.

HEMEROCALLIS, DAY-LILLY, in botany, a genus of the hexandria monogynia claſs of plants, the corolla of which is of an infundibuliform figure; the tube is ſhort; the limb is patent, and divided into ſix ſomewhat reflex ſegments: the fruit is an ovato-trilobous, trigonal capſule, formed of three valves, and containing three cells: the ſeeds are numerous and roundiſh.

HEMERODROMI, in grecian antiquity, centinels and guards appointed for the ſecurity and preſervation of cities, and other places.

They went out of the city every morning, as ſoon as the gates were opened, and kept patrolling all day about the place: ſometimes alſo making excurſions further into the country, to ſee that there were no enemies lying in wait to ſurprize them.

HEMERODROMI were alſo a ſort of couriers among the antients, who only travelled one day, and then delivered their packets or diſpatches to a freſh man, who run his day, and ſo on to the end of the journey. See COURIER and EXPRESS.

HEMI, a word uſed in the compoſition of divers terms, ſignifying the ſame with ſemi, or demi, *viz.* one half; being an abbreviature of ἥμισυς, which ſignifies the ſame. The Greeks ſuppreſſed the laſt ſyllable of ἥμισυς, in the compoſition of words.

HEMICRANIA, in medicine, a ſpecies of head-ach, wherein only one half or ſide of the head is affected. See HEAD-ACH.

HEMICYCLE, in architecture, is defined by Daviler to be an arch forming a perfect ſemicircle. See the articles ARCH and BRIDGE.

To conſtruct ſuch an arch of hewn ſtone, they divide the hemicycle into a certain number of equal parts, and faſhion an equal number of vouſoirs, which will complete the arch: however, that there may be no joint in the middle, where the key-ſtone ſhould be, they always take care that the number of vouſoirs be an odd one.

HEMICYCLIUM, in antiquity, a part of the orcheſtra in the antient theatres: but Scaliger obſerves, that this part was only uſed, when ſome perſon was ſuppoſed to be juſt arrived from ſea, as in Plautus's Rudens.

HEMICYCLIUM alſo ſignified a kind of ſun-dial; being a concave ſemicircle, the upper cuſp of which looked to the north. On the middle of the hemicyclium ſtood a ſtyle, whereof the point that correſponded to the center of the hemicycle, repreſented the center of the earth; and its ſhadow, being projected on the concavity of the hemicycle, which repreſented the ſpace between the two tropics, pointed out not only the declination of the ſun, and the day of the month, but likewiſe the hour of the day.

HEMINA, in roman antiquity, a liquid meaſure which, according to Arbuthnot, was equal to half a wine-pint engliſh meaſure; its contents being 2,818 ſolid inches. See the article MEASURE.

HEMIOLIA, or HEMIOLIUS, among antient muſicians, a ſort of proportion now called ſeſquialteral. See the article SESQUIALTERAL.

HEMIONITIS, in botany, a genus of the cryptogamia-muſcorum claſs of plants, the fructifications of which are arranged into lines, ſometimes branched, often uniting with and interſecting one another.

HEMIOPE, in antiquity, a flute with ſmall holes. See the article FLUTE.

HEMIPLEGIA, or HEMIPLEXIA, among phyſicians, a palſy of one half of the body. See the article PALSY.

HEMISPHÆRIA, LADY-COW, in zoology, a genus of beetles, with clavated and entire antennæ; and whoſe thorax, with the exterior wings, which are marginated, conſtitutes an hemiſpheric figure. There are a great many ſpecies of lady-cows, the moſt common of which is that with reddiſh wings, and ſeven black ſpots on them; an inſect too well known to need farther deſcription. See the article COCCINELLA.

HEMISPHERE, *hemiſphærium*, in geometry, the half of a globe or ſphere, when it is ſuppoſed to be cut through its center in the plane of one of its great circles. Thus the equator divides the terreſtrial globe into the northern and ſouthern hemiſpheres: in the ſame manner the meridian divides the globe into the eaſtern and weſtern hemiſpheres; and the horizon into two hemiſpheres, diſtinguiſhed by the epithets upper and lower. See the articles SPHERE and GLOBE.

The center of gravity of an hemiſphere, is $\frac{3}{8}$ of the radius diſtant from the vertex.

HEMISPHERE is alſo uſed to denote a projection of half the terreſtrial globe, or half the celeſtial ſphere, on a plane, and frequently called planiſphere.

HEMISPHEROIDAL, in geometry, an appellation given to whatever approaches to the figure of an hemiſphere, but is not exactly ſo.

HEMISTICH, ἡμιστιχος, in poetry, denotes half a verſe, or a verſe not completed.

Of this there are frequent examples in Virgil's Æneid; but whether they were left unfiniſhed by deſign or not, is diſputed among the learned; ſuch are, *Ferro accincta vocat*, Æn. II. v. 614. And, *Italiam non ſponte ſequor*, Æn. IV. v. 361.

In reading common engliſh verſe, a ſhort pauſe is required at the end of each hemiſtich, or half verſe.

HEMITONE, in muſic, the ſame with a ſemitone, or half note. See TONE.

HEMITRITÆUS, among phyſicians, a kind of intermitting fever, being a ſemitertian. See FEVER and TERTIAN.

HEMLOCK, *conium*, in botany. See the article CONIUM.

Water HEMLOCK, *cicuta*. See CICUTA.

HEMP, *cannabis*, in botany. See the article CANNABIS.

Hemp is a uſeful plant, purchaſed at a

dear rate from foreigners, when it might be cultivated among ourſelves, to the great benefit of the nation in general. It delights in warm, ſandy, or ſomewhat gravelly ſoil; but it muſt be ſomewhat rich, and of a good depth. The beſt ſeed is that which is brighteſt, and retains its colour and ſubſtance in rubbing. Three buſhels will ſow an acre; but the richer the land is, the thicker it muſt be ſown, and the poorer it is, the thinner. The time of ſowing it, is from the latter end of March, to the end of April, according as the ſpring falls out; but the earlier it is ſown the better. If it be a dry ſeaſon, great care muſt be taken to preſerve it from birds.

The firſt ſeaſon for gathering it is about Lammas, when a good part of it will be ripe; that is, the light ſummer hemp which bears no ſeed, and is called fimble-hemp. When it is ripe the ſtalks grow white, and the leaves fall downwards, turning yellow at the top: it muſt then be pulled up, dried, bound up in bundles as big as may be graſped in both hands, and laid by for uſe. Care muſt be taken not to break what is left ſtanding, becauſe it is to grow till near Michaelmas before it will be fit to gather: this is uſually called karle-hemp. When it is gathered, lay it in the ſun three or four days to dry, and then ſtack or houſe it till the ſeed be threſhed out.

An acre of hemp, in the beſt land, commonly yields about two or three quarters of ſeed, which, with the hemp unwrought, is often worth from 5 to 8 l. but if wrought, from 10 to 12 l. but the fimble-hemp is not worth above half as much as the other.

As to the method of preparing it, after the ſeeds are threſhed out of the heads, the ſtalks are laid up in bundles and ſteeped in a ſtanding water, the cleaner it is the better; they are faſtened to poles, and left to ſoak about fifteen days; and when the ſubſtance of the ſtalk is almoſt rotten, the bundles are taken out and well dried. But flax, inſtead of being ſteeped in water, is uſually expoſed alternately to the moiſt air of the night, and the heat of the ſun, by which means it receives a finer colour.

When hemp and flax are well penetrated and afterwards completely dried, they are bruiſed by handfuls on a block, with a kind of mallet; all the bullen, which is the inward ſubſtance of the ſtem, flies off in ſhivers, by the force of the blows, and nothing remains in the hands of the beater but the thin bark in large threads, through the whole length of the ſtem. This parcel of threads is afterwards hung on a perpendicular board, and bruiſed with a wooden beetle, in order to ſhake out all the little ſtraws that may happen to remain of the bullen. All the groſs parts are now ſeparated from the ſtem, and the threads of the bark receive their perfection from the comb or hatchel.

The refuſe of this combing, which conſiſts of all the threads which are too thick, is called tow, for the uſe of which ſee the article TOW.

Hemp and flax are the materials of a variety of profitable manufactures; for beſides linen, great quantities of ticken of all fineneſſes, ſail-cloth, incle, tape, ſacking, girtwip, cordage, twine, nets, and many other things are made of them: and they furniſh multitudes of other manufactures, which employ the poor, and bring, by their exports, profit to the nation. But as we are under the neceſſity of importing very large quantities of hemp from foreign countries, the production of this article among ourſelves, and in our plantations, cannot be too plentifully cultivated, nor too highly encouraged.

For the laws relating to hemp and flax, ſee the article FLAX.

HEMPSTEAD, a market-town of Hartfordſhire, twenty-nine miles north-weſt of London.

HEN, *gallina*, in ornithology, though uſed in a general ſenſe to ſignify any female bird, is more particularly reſtrained to thoſe of the order of gallinæ. See the article GALLINÆ.

HEN BANE, a plant called by botaniſts hyoſcyamus. See HYOSCYAMUS.

HEN-HARRIER, in ornithology, the falco with a brown back, and a variegated, black, and brown tail. See the article FALCO.

This is a conſiderably large ſpecies, and is equal to a well grown pullet in ſize; the head is ſmall, and ſomewhat flatted at the top; the beak is large, and very robuſt; it is broad and thick at the baſe, very much hooked, and extremely ſharp at the point; the baſe of it is covered with a thick yellow membrane, in which are ſituated the noſtrils, and there are a kind of black hairs reſembling whiſkers.

HENDECAGON, in geometry, a figure that hath eleven ſides, and as many angles.

In fortification, hendecagon denotes a place defended by eleven baſtions.

HENEBON, a town of Britany, in France, twenty-two miles north-weſt of Vanes.

HENLEY, a market-town of Oxfordſhire, ſituated on the river Thames, twenty miles ſouth-eaſt of Oxford, and thirty-five weſt of London.

HENLEY is alſo a market-town of Warwickſhire, ſeven miles ſouth-weſt of Warwick.

HEN-MOULD, among farmers, denotes a black ſpungy ſoil fitter for grazing than for corn.

In ſome places, indeed, they give the name of hen-mould to a rich black earth mixed with whitiſh ſtreaks, which is exceeding fertile.

HENNEBURG, a town of Germany, in the circle of Franconia, and the capital of the county of Henneburg: eaſt long. 10° 27′, and north lat. 50° 40′.

HENOTICON, in church-hiſtory, a decree or edict of the emperor Zeno, made at Conſtantinople, in the year 482, by which he pretended to reconcile all parties under one faith. It is generally agreed that Peter, patriarch of Alexander, and Acacius, patriarch of Conſtantinople, were the authors of this decree, and that their deſign was to compliment the emperor with a right of preſcribing regulations in matters of faith. The emperor, by this decree, arrogated to himſelf the right of being head of the church. Pope Simplicius, however, in the year 483, condemned the henoticon, and cited Acacius, the chief promoter of it, to appear before him at Rome; but it was not entirely ſuppreſſed till the year 518.

HENRICO, a county of the colony of Virginia, in North America.

HENRY, or CAPE-HENRY, the ſouth cape of Virginia, at the entrance of Cheſepeak-bay: weſt long. 74° 50′, north lat. 37°.

HENTING, among farmers, a method of ſowing immediately before the plough, by which it is pretended, a great deal of charge is ſaved. See SOWING.

HENTING-FURROWS, thoſe turned from each other at the bottom, in ploughing ridges. See the article PLOUGHING.

HEPAR, the LIVER, in anatomy. See the article LIVER.

HEPAR SULPHURIS, LIVER OF SULPHUR, in pharmacy, according to Quincy, is thus made; take of flowers of ſulphur, four ounces; ſalt of tartar in powder, an ounce and half: let them be well mixed together, and then melted in an earthen diſh, and kept conſtantly ſtirring till the maſs has acquired a red colour, care being taken that it does not catch fire.

HEPAR UTERINUM, in anatomy, the ſame with placenta. See PLACENTA.

HEPATIC, in medicine and anatomy, any thing belonging to the liver.

HEPATIC ALOE. See the article ALOE.

HEPATIC DUCT. See PORUS BILARIUS.

HEPATIC FLUX, a flux of the belly, of a very ſingular kind, and ſo rarely met with, that many authors have confounded the accounts of it with thoſe of dyſenteries and hæmorrhoidal fluxes. The ſigns by which it is known are theſe; the patient voids by the anus a liquid matter reſembling water in which raw fleſh had been waſhed; this is attended with pains and a ſenſe of weight and tenſion in the abdomen, and ſpaſtic motions about the loins, which ſometimes extend themſelves to the right ſide, toward the region of the liver. In ſome patients there is no ſenſation of any pain, or any particular ſymptom; and, in ſome, a teneſmus is conſtantly joined with this voiding of a bloody fluid.

The perſons ſubject to this diſeaſe are men; and thoſe chiefly between the age of eighteen and forty, for the moſt part; as alſo ſuch as are of a ſanguineo-phlegmatic habit, and of a ſedentary life.

The antients ſuppoſed this to be owing to a debility of the liver, which was not able, in this caſe, properly to attract or retain the blood; but it ſeems rather to belong to the hæmorrhoidal diſcharges, where, when pure and proper blood is not voided, this fluid comes in its place. This flux is not dangerous at the time; but when it is long continued, it will at length wear down the patient's ſtrength, and bring on bad habits.

This diſeaſe, according to Junker, is to be treated in the ſame manner as the hæmorrhoidal diſcharge, when obſtructed; and attemperating and abſtergent medicines are to be given with gentle purges: rhubarb, in doſes from a ſcruple to two or more, is to be given every day, for a long time: after this, nitre, tartarium vitriolatum, the alkaline ſalts of plants, as of worm-wood, with the abſorbent powders, ſuch as crab's eyes; and to theſe may be added decoctions of ſmall centaury, and the like herbs.

HEPATIC VEIN. See BASILICA.

HEPATICA, LIVER-WORT, in botany, a ſpea ſpecies of anemone. See the article ANEMONE.

This plant is chiefly uſed in obſtructions of the liver and viſcera; as alſo in the ſcab, gonorrhœa, and fever.

HEPATITIS, in medicine, the name of an acute, continuous, and inflammatory fever, in which nature frequently and forcibly propels the humours through the liver, ſeemingly with an intent to reſolve and abſterge congeſtions and ſtaſes of the blood in that viſcus. See the article INFLAMMATION.

The hepatitis is diſtinguiſhed from all other fevers, by the ſeat of it in the liver, and by its being, of all other fevers, the moſt fatal. It differs, however, in degree, ſome caſes depending on a more ſuperficial, ſome on a deeper and more internal inflammation of the liver. It uſually ſeizes the patient with a chilneſs, which is ſucceeded by a violent heat, attended with an inſupportable thirſt: the patient perceives a ſevere and heavy pain on the right ſide, about the ſeventh or eighth rib; and is affected with a violent ſtreightneſs of the breaſt, and difficulty of breathing; the extremities are very apt to become cold; there are frequent nauſeas, and reachings to vomit, and a bilious matter is thrown up: the urine for the firſt days is reddiſh and thick, and about the fourth day uſually begins to depoſite a ſediment; the remaining part of it being however ſtill turbid; a very peculiar ſymptom is, that the patient frequently changes colour, being at times pale, and at other times browniſh or yellowiſh; the yellowneſs principally affecting the eyes and face. In caſes where the matter in the liver comes to a ſuppuration, all the ſymptoms become more ſevere; the heat is greater, the reſpiration more difficult, *&c.* Finally, the breaking of the tumour is known by a ſudden remiſſion of the pain, with a terrible faintneſs and lowneſs of the ſpirits, and a hectic; and when the matter is diſcharged into the cavity of the abdomen, it is known by the ſwelling of that part. The general cauſes of the hepatitis are a plethora and a derivation of blood into the liver, which there forms congeſtions and ſtaſes: this is brought on by violent motions of the body, by violent ſtrainings, by taking aſtringents in inflammatory fevers, and by driving back the matter in cutaneous eruptions; and, finally, by applying cold external medicines to the regions of the liver, or by cupping upon the part. Bleeding is very proper in the beginning of the diſeaſe; and after this, the bowels are to be kept gently open, not by ſtimulating purges, but by emollient clyſters, and the mildeſt and gentleſt cathartics. The mixtura ſimplex is a very valuable medicine given ſeveral times a day; and in the intermediate hours the following powder is to be given: take purified nitre, and tartarium vitriolatum, each two drams; crab's eyes, and the jaw of a pike reduced to powder and ſated with lemon juice, of each four ſcruples; diaphoretic antimony, a dram: the doſe of this mixed powder is a ſcruple. In the mean time the region of the liver ſhould be bathed externally with ſpirit of wine camphorated, impregnated with ſaffron. Above all things, reſt, moderate warmth, and a placid regimen are to be obſerved.

HEPATOSCOPIA, in antiquity, that branch of divination, which predicted future events by inſpecting the entrails of animals, but eſpecially the liver. See the article DIVINATION.

HEPATUS, in ichthyology, a ſpecies of labrus, with the lower jaw longer than the upper, a forked tail, and tranſverſe black lines on each ſide.

HEPHÆSTIA, in grecian antiquity, an athenian feſtival in honour of Vulcan, the chief ceremony of which was a race with torches.

It was performed in this manner: the antagoniſts were three young men, one of whom, by lot, took a lighted torch in his hand, and began his courſe; if the torch was extinguiſhed before he had finiſhed the race, he delivered it to the ſecond; and he, in like manner, to the third: the victory was his, who firſt carried the torch lighted to the end of the race: and to this ſucceſſive delivering of the torch, we find many alluſions in antient writers.

HEPSETUS, in ichthyology, a fiſh otherwiſe called atherina. It is a long and ſlender fiſh, with a forked tail, and its back variegated with black ſpots.

HEPTACHORD, in the antient poetry, ſignified verſes that were ſung or played on ſeven chords, that is, on ſeven different notes. In this ſenſe it was applied to the lyre, when it had but ſeven ſtrings.

One of the intervals is alſo called an heptachord, as containing the ſame number of degrees between the extremes.

HEPTAGON, in geometry, a figure conſiſting of ſeven ſides, and as many angles.

In fortification, a place is termed an heptagon, that has ſeven baſtions for its defence.

HEPTAGONAL NUMBERS, in arithmetic, a ſort of polygonal numbers, wherein the difference of the terms of the correſponding arithmetical progreſſion is 5. One of the properties of theſe numbers is, that if they be multiplied by 40, and 9 be added to the product, the ſum will be a ſquare number. See NUMBER.

HEPTAMERIS, in muſic, the ſeventh part of a meris; being, according to M. Sauveur, the forty-third part of the octave. See the article OCTAVE.

HEPTANDRIA, in botany, a claſs of plants, the ſeventh in order, comprehending the plants that have hermaphrodite flowers, and ſeven ſtamina in each. See FLOWER, STAMINA, *&c.*

Of this claſs there are only two genera, the eſculus and trientalis. See ESEULUS and TRIENTALIS.

HEPTANGULAR, in geometry, an appellation given to figures which have ſeven angles.

HEPTARCHY, a government of ſeven perſons: alſo a ſtate or country divided into ſeven kingdoms, and governed by ſeven independent princes; in which ſenſe it is particularly applied to the government of South Britain, when divided amongſt the Saxons.

HEPTATEUCH, the ſeven firſt books of the Old Teſtament, containing the pentateuch, or five books of Moſes, and the books of Joſhua and Judges.

HEPHTHEMIMERIS, in antient poetry, a verſe conſiſting of three feet and an half, or ſeven half feet.

It likewiſe denotes a cæſura after the third foot of a verſe. See CÆSURA.

HERACLEA, a port-town of Romania, in european Turky, ſituated on the Propontis, ſixty miles ſouth-weſt of Conſtantinople; it was once a great city: eaſt long. 28°, and north lat. 41°.

HERACLEIA, an antient feſtival celebrated in honour of Hercules by ſeveral ſtates of Greece.

HERACLEONITES, a ſect of chriſtians, the followers of Haracleon, who refined upon the gnoſtic divinity, and maintained that the world was not the immediate production of the Son of God, but that he was only the occaſional cauſe of its being created by the demiurgus. The heracleonites denied the authority of the prophecies of the Old Teſtament, maintaining that they were mere random ſounds in the air; and that St. John the Baptiſt was the only true voice, that directed to the Meſſiah.

HERACLEUM, in botany, a genus of the pentandria-digynia claſs of plants, the general flower of which is difform and radiated; the ſingle flowers of the diſc conſiſt each of five equal petals, but thoſe of the radius conſiſt of five unequal petals: the fruit is elliptic, compreſſed, and ſtriated on each ſide in the middle, and contains two oval compreſſed ſeeds.

To this genus belongs the ſphondylium, or cow's parſnep of authors.

HERACLIDÆ, or *return of the* HERACLIDÆ *into Peloponeſus*, in chronology, a famous epocha, that conſtitutes the beginning of profane hiſtory; all the time preceding that period being accounted fabulous.

This return happened in the year of the world 2862, an hundred years after they were expelled, and eighty after the deſtruction of Troy.

HERAIA, an antient greek feſtival obſerved at Argos and ſome other places, in honour of Juno, in which two proceſſions were made to the temple of that goddeſs, one by men in armour; and a ſecond, in which the prieſteſs of Juno was drawn in a chariot by white oxen, and on their arrival at the temple, they offered an hecatomb.

Another feſtival of this name was celebrated every fifth year at Elis, at which ſixteen matrons were appointed to weave a garment for the goddeſs: there were alſo games, at which young virgins contended for the victory.

This name was alſo given to a ſolemn day of mourning kept at Corinth for Medea's children, who were buried in the temple of Juno Aſtræa.

HERALD, an officer at arms, whoſe buſineſs it is to declare war, to proclaim peace, to marſhal all the ſolemnities at the coronation, chriſtening, marriage, and funeral of princes, to blazon and examine coats of arms, *&c.*

Heralds were formerly held in much greater eſteem than they are at preſent, and were created and chriſtened by the king, who pouring a gold-cup of wine on their head, gave them the herald-name; but this is now done by the earl-marſhal. They could not arrive at the dignity of herald without having been ſeven years pourſuivant; nor could they quit the office of herald, but to be made king at arms. See POURSUIVANT.

The three chief heralds are called kings at arms, the principal of which is Garter; the next is called Clarencieux, and the third Norroy; theſe two laſt are called provincial heralds. See KING *at arms*. Beſides theſe there are ſix other inferior heralds, *viz.* York, Lancaſter, Somerſet, Richmond, Cheſter, and Windſor; to which, on the coming of king Geo. I. to the crown, a new herald was added, ſtyled Hanover herald; and another, ſtyled Gloceſter king at arms.

The kings at arms, the heralds, and four pourſuivants are a college or corporation, erected by a charter granted by Richard III. by which they obtained ſeveral privileges, as to be free from ſubſidies, tolls, and all troubleſome offices. See the article COLLEGE.

HERALDRY, the art of armoury and blazoning, which comprehends the knowledge of what relates to ſolemn cavalcades and ceremonies at coronations, inſtalments, the creation of peers, nuptials, funerals, *&c.* and alſo whatever relates to the bearing of arms, aſſigning thoſe that belong to all perſons, regulating their right and precedencies in point of honour, and reſtraining thoſe who have not a juſt claim, from bearing coats of arms that do not belong to them. See BLAZONING, ARMS, SHIELD, *&c.*

HERAT, a city of Perſia, in the province of Choraſſan: eaſt long. 61°, and north lat. 34° 30′.

HERB, in pharmacy, an appellation given to the ſtalks and leaves of plants, eſpecially ſuch as are fleſhy and ſucculent, and die away every year; but is alſo frequently uſed to denote the leaves alone.

The term herb, therefore, denotes the ſtalks and leaves, in contradiſtinction to the flowers, ſeeds, and roots. See PLANT, FLOWER, FRUIT, ROOT, *&c.*

Quincy gives the following directions for the gathering and preſerving of herbs. They ſhould be gathered juſt when beginning to flower, as being then in greateſt perfection; and this muſt be done when there is no rain or dew upon them, otherwiſe they will be apt to turn black in drying. They ought to be dried in the ſhade, as too great heat exhales their moiſture too faſt, and deſtroys their beautiful verdure. The freſher they are uſed the better, though ſome may be kept much longer than others. So long as the freſh colour they dry with continues, they may be truſted in medicine, but no longer. They are much better for decoction and diſtillation when dried than green, becauſe their ſaline and volatile parts very difficultly mix with a menſtruum, until their native phlegm be evaporated.

HERB-TRUELOVE, *herba paris*, in botany. See the article PARIS.

HERBAGE, in law, ſignifies the paſture provided by nature for the food of cattle; alſo the liberty to feed cattle in the foreſt, or in another perſon's ground.

HERBAL, in literary hiſtory, a book that treats of the claſſes, genera, ſpecies, and virtues of plants. See the articles PLANT and BOTANY.

HERBAL is ſometimes alſo uſed for what is more uſually called hortus ſiccus. See the article HORTUS.

HERBALIST, the author of an herbal, or one who is ſkilled in plants.

HERBE, in the french academies, a reward, or ſome good ſtuff, given to a horſe who has worked well in the manege.

HERBORG, a town in the circle of the Upper Rhine, and territory of Naſſau: eaſt long. 8° 15′, and north lat. 50° 36′.

HERCINIAN FOREST, a foreſt which antiently extended the whole length of Germany and Bohemia, ſome remains of which are ſtill in being, *viz.* the Black Foreſt, Odenwald near Heidelburg, Stigewald in Wurtſburg and Bamberg, and Hartſwald in Brunſwic.

HERCOLE, a port-town of Tuſcany, on the coaſt called Stato del Preſidii: eaſt long. 12°, and north lat. 42° 25′.

HERCOLE is alſo a little iſland, near the town of the ſame name.

HERCULES, in aſtronomy, a conſtellation of the northern hemiſphere, ſaid to contain from 28 to 95 ſtars.

HERCULES PILLARS, in antiquity, a name given to mount Calpe in Spain, near Gibraltar, on the european ſide of the ſtreights, and mount Avila on the african ſide.

HERCULEUS MORBUS, the EPILEPSY, in medicine. See EPILEPSY.

HERD, a company of eatable cattle of the larger ſort, as cows, oxen, ſwine, deer, *&c.* alſo of wild beaſts.

HEREDITAMENTS, whatever immoveable things a perſon may have to himſelf and his heirs, by way of inheritance; and which, if not otherwiſe bequeathed, deſcend to him who is next heir, and not to the executor, as chattels do.

This word extends to whatever is inheritable, be it real, perſonal, or mixed: and in conveyances, by the grant of hereditaments,

ments, manors, houſes, lands, rents, &c. will paſs.

HEREDITARY, an appellation given to whatever belongs to a family by right of ſucceſſion, from heir to heir.

Some monarchies are hereditary, and others elective; and ſome hereditary monarchies deſcend only to the heirs male, as in France; but others, to the next of blood, as in Spain, England, &c. Thus the dominions of the emperor are diſtinguiſhed into hereditary, which are thoſe he derives from his anceſtors by right of inheritance, and thoſe he enjoys in quality of emperor by virtue of his election.

Hereditary is alſo applied to offices and poſts of honour annexed to certain families; thus the office of earl-marſhal is hereditary in the family of Howard.

Hereditary is alſo figuratively applied to good or ill qualities, ſuppoſed to be tranſmitted from father to ſon: thus we ſay, virtue and piety are hereditary virtues in ſuch a family: and that in Italy the hatred of families is hereditary. And indeed the gout, the king's evil, madneſs, &c. may really be hereditary diſeaſes.

HEREFORD, the principal city of Herefordſhire, ſituated on the river Wye, twenty-four miles north-weſt of Gloceſter, and one hundred and twenty weſt of London: weſt long. 2° 42′, and north lat. 52° 6′.

It ſends two members to parliament.

HERESY, the crime of obſtinately perſiſting in opinions, that are contrary to the fundamentals of religion.

There is no law that expreſly determines this offence, it being impoſſible to ſet down all the particular errors that may be ſaid to be heretical, and in relation to which ſo many diſputes have ariſen: in general, however, thoſe opinions that were ſuppoſed to be condemned by the ſcriptures, or the four firſt general councils, have been accounted hereſy.

Hereſy was antiently treaſon, and puniſhed by burning the offender; but he forfeited neither lands nor goods, becauſe the proceedings againſt him were pro ſalute animæ. At preſent, all puniſhments of death, and the old ſtatutes which gave power to arreſt or impriſon perſons for hereſy, are repealed: though, by the common law, an obſtinate heretic, being excommunicated, may be ſtill impriſoned, on the writ de excommunicato capiendo, till he makes ſatisfaction to the church. And perſons denying the truth of the chriſtian religion, or the divine authority of the ſcriptures, &c. are liable, for the ſecond offence, to three years impriſonment, by 9 & 10 Will. III. cap. xxxii.

HERETIC, a general name for all ſuch perſons, under any religion, but eſpecially the chriſtian, as profeſs or teach religious opinions contrary to the eſtabliſhed faith, or to what is made the ſtandard of orthodoxy. The laws both of church and ſtate were antiently very ſevere againſt thoſe who were adjudged to be heretics: the principal of which were, firſt, the general note of infamy affixed to all heretics in common. Secondly, all commerce forbidden to be held with them. Thirdly, the depriving them of all offices of profit and dignity. Fourthly, the rendering them incapable of diſpoſing of their eſtates by will, or of receiving eſtates from others. Fifthly, impoſing on them pecuniary mulcts. Sixthly, proſcribing and baniſhing them. Seventhly, inflicting corporal puniſhment on them, ſuch as ſcourging, &c. before baniſhment. Beſides theſe laws, which chiefly affected the perſons of heretics, there were others which tended to the extirpation of hereſy, ſuch as thoſe which forbad heretical teachers to propagate their opinions in public or private: thoſe which denied the children of heretical parents their patrimony and inheritance, unleſs they returned to the church: ſuch as ordered the books of heretics to be burnt. There were many other penal laws againſt heretics, from the time of Conſtantine to Theodoſius juinor, and Valentinian III. But the few already mentioned may be ſufficient to give an idea of the rigour with which the empire treated ſuch perſons, who held or taught opinions contrary to the faith of the catholic church; whoſe diſcipline towards heretics was no leſs ſevere than the civil laws: but ſince theſe early times, the moſt horrid deaths, and the moſt excruciating tortures, have been invented. For the laws of England in relation to heretics, ſee the preceding article.

HERISSON, in fortification, a beam armed with a great number of iron-ſpikes, with their points outwards, and ſupported by a pivot, on which it turns.

Theſe ſerve as a barrier to block up any paſſage, and are frequently placed before the gates, and more eſpecially the wicket-doors of a town or fortreſs, to ſecure thoſe paſſages, which muſt of neceſſity be often opened and ſhut.

HERK, a town of Germany, in the biſhoprick of Liege, ſituated on a river of the ſame name, near its confluence with the Demer: eaſt long. 5° 20′, and north lat. 51°.

HERLING, a market-town of Norfolk, twenty miles ſouth-weſt of Norwich.

HERMÆ, among antiquarians, ſtatues of the god Mercury, made of marble, and ſometimes of braſs, without arms or feet, and ſet up by the Greeks and Romans in the croſs-ways.

Antiquity likewiſe furniſhes us with compound hermæ, or ſtatues of Mercury joined with ſome other deity, as Herm-Athena, or Mercury and Minerva; Herm-Hercules, or Mercury and Hercules; Herm-Eros, or Mercury and Cupid: and ſo of others.

HERMÆA, in antiquity, antient greek feſtivals, in honour of the god Hermes, or Mercury. One of theſe was celebrated by the Pheneatæ, in Arcadia; a ſecond by the Cyllenians, in Elis; and a third by the Tanagræans, where Mercury was repreſented with a ram upon his ſhoulder, becauſe he was ſaid, in a time of plague, to have walked thro' the city in that poſture, and to have cured the ſick; in memory of which, it was cuſtomary at this feſtival, for one of the moſt beautiful youths in the city, to walk round the walls, with a ram upon his ſhoulder.

A fourth feſtival of the ſame name was obſerved in Crete, when it was uſual for the ſervants to ſit down at the table while their maſters waited: a cuſtom which was alſo practiſed at the roman ſaturnalia.

HERMANNIA, AFRICAN MARSH-MALLOWS, in botany, a genus of the monadelphi-pentandria claſs of plants, with a roſaceous flower, the petals of which are ſemitubular at the baſe; the fruit is a roundiſh capſule, containing a great many ſmall ſeeds.

HERMANSTAT, the capital city of Tranſilvania, ſubject to the houſe of Auſtria: eaſt long. 24°, north lat. 46° 32′.

HERMAPHRODITE, a perſon of both ſexes, or who has the parts of generation both of male and female.

It is now generally allowed, that there is no ſuch thing as a true hermaphrodite; moſt, if not all thoſe who paſs for ſuch, being mere women, whoſe clitoris is grown to an enormous ſize, and the labia pudendi become unuſually tumid.

Among the inſect-claſs of animals, indeed, hermaphrodites are very frequent: ſuch are worms, ſnails, leeches, *&c.*

HERMAPHRODITE FLOWERS, among botaniſts. See FLOWER.

HERMATHENA, among antiquarians, a ſtatue repreſenting Mercury and Minerva both in one. See HERMÆ.

HERMES, or HERMÆ. See HERMÆ.

HERMETIC, or HERMETICAL, an appellation given to whatever belongs to chemiſtry, from Hermes Triſmegiſtus, who is ſuppoſed to have been its inventor.

HERMETICAL PHILOSOPHY, that which undertakes to ſolve the various phænomena of nature, from the chemical principles, ſalt, ſulphur, and mercury.

HERMETICAL SEAL, among chemiſts, a method of ſtopping glaſs-veſſels, uſed in chemical operations, ſo cloſely, that the moſt ſubtle ſpirit cannot eſcape through them.

It is commonly done by heating the neck of the veſſel in a flame, till ready to melt, and then twiſting it cloſely together with a pair of pincers. Or, veſſels may be hermetically ſealed, by ſtopping them with a glaſs plug, well luted; or, by covering the veſſel with another ovum philoſophicum.

HERM-HARPOCRATES, in antiquity, a compound ſtatue of Mercury and Harpocrates. See the article HERMÆ.

HERMIT, a devout perſon retired into ſolitude to be more at leiſure for contemplation, and to diſencumber himſelf from the affairs of the world.

An hermit is not reputed a religious, unleſs he has made the vows.

Paul the hermit is uſually reckoned the firſt: though St. Jerom at the beginning of the life of that ſaint, ſays it is not known who was the firſt. Some go back to St. Anthony, ſome to John the Baptiſt, and others to Elias. However, ſeveral of the antient hermits, though they lived in deſarts, had nevertheleſs numbers of religious accompanying them.

There are alſo ſeveral orders and congregations of religious diſtinguiſhed by the title of hermits; as the hermits of St. Auguſtin, of St. John the Baptiſt, of St. Jerom, of St. Paul, of St. James de Montlio, of St. William, of St. Benedict of Montefabalo, *&c.*

HERMIT, in zoology, the long-tailed ſquilla, with a ſoft tail, and the right claw the largeſt. See the article SQUILLA.

This grows to two inches and a half in length; the legs are ſlender and long, and the anterior ones have claws on them like the common crabs.

HERMODACTYLS, in pharmacy, a root ſuppoſed to be that of the plant colchicum. See the article COLCHICUM.

Hermodactyls are brought us from Egypt and Syria, where the people eat them to make themſelves fat. They uſe them medically, while freſh and juſt taken out of the earth, as a vomit and purge. The dried roots, as we have them in the ſhops, are a gentle purge, and have the credit of being peculiarly good in rheumatic diſorders. The doſe in powder is from a ſcruple to a dram, or more, but they are ſo weak a purge as ſeldom to be given alone: their proper correctives are the ſpices, ginger, cloves, and the like.

HERMON, a mountain on the eaſt of Syria and Paleſtine, in Aſia.

HERNANDIA, in botany, a genus of plants, the characters of which are not perfectly aſcertained; the corolla of the male as well as the female flower, is divided into ſix ſegments: there is no pericarpium, the cup is very large, inflated and roundiſh, and intire at the mouth: the ſeed is an oval, ſulcated, unilocular nut; the nucleus is globoſe.

HERNGRUNT, a town of Upper Hungary, ſituated north of Buda, near the Carpathian mountains: eaſt long. 19° 20′ north lat. 48° 47′.

HERNIA, in medicine, a preternatural tumour formed in the abdomen, particularly in the navel, inguen, and ſcrotum, by a protuberance of the inteſtines or omentum, and uſually known by the name of rupture.

Theſe tumours differ firſt, according to their place or ſituation: thoſe formed at the navel are called omphalocele, or exomphalus. See EXOMPHALUS.

A hernia in the groin is called bubonocele, and that of the ſcrotum, oſcheocele, &c. See the article BUBONOCELE and OSCHEOCELE, &c.

Hernias are alſo diſtinguiſhed from the body or ſurface contained in, or forming, the tumour: when from a protuberance of the inteſtines, a hernia is termed enterocele; when from the omentum, epiplocele; if from flatuſes, pneumatocele; and if from water, hydrocele, &c. See the articles ENTEROCELE, EPIPLOCELE, PNEUMATOCELE, HYDROCELE, &c.

Hernias are alſo diſtinguiſhable from circumſtances leſs remarkable, as from the ſize, being either ſmall, large, or enormous; from their conſiſtence, being either hard, ſoft, fixed or moveable, capable of being returned into the abdomen, or not; which latter are called adheſive ruptures: ſometimes the parts prolapſed are ſo confined by ſtricture and inflammation, that the flatus and fæces cannot be returned, which kind of ruptures are called incarcerated: ſome are attended with pain; others without; or with ſickneſs, vomiting, and other bad ſymptoms.

HERNIA HUMORALIS, a painful and inflammatory tumour, of one or both teſticles, ariſing generally from a ſuppreſſion of a virulent running in a gonorrhœa, or from too ſtrong and ſtimulating cathartics, eſpecially if the patient happens to take the leaſt cold during their operation. See GONORRHOEA.

The cure of this ſymptom, according to Turner, muſt commence with bleeding; a bag-truſs, muſt be immediately provided, which may ſupport the weight of the tumour, and contain and ſecure the proper applications: among which none excels a cataplaſm of bean-meal, with ſimple oxymel; adding to it a little of the oil of roſes, or ointment of elder, to preſerve it from hardening and drying. During theſe applications, forbear all reſtringent or balſamic medicines, and purge the patient briſkly with calomel and pilulæ ex duobus: but particular care muſt be taken that he gets no cold, by which method the ſwelling is uſually in a few days diſperſed, and the running always appears, which muſt be carried off by the ſame, or the like cathartics repeated at proper intervals. But if notwithſtanding, the pain and fluxion ſtill increaſe with inflammation, threatening an abſceſs, the patient muſt be vomited with the turpeth mineral; ſuch intervals being obſerved as may prevent any ſoreneſs of his chops, till the tumour ſubſides: then purge off the reliques: when, if any ſchirrhous hardneſs ſhould remain, you may endeavour to diſperſe it with the emplaſtrum diaſulphuris, the emplaſtrum de ranis cum mercurio & de cicuta cum ammoniaco, ex ammoniaco, the diagalbanum; or with ſuffumigation with vinegar.

HERNIARIA, RUPTURE-WORT, in botany, a genus of the petandria-digynia claſs of plants, having no corolla: the fruit is a ſmall capſule placed in the bottom of the cup, covered, and hardly ſplitting; the ſeed is ſingle, ovato acuminated, and ſmooth.

This plant is of a refrigerating and drying quality. Its principal uſe is in curing an hernia; in waſting the ſtone in the kidneys, and bladder; in inciding mucoſities of the ſtomach and other parts, and bringing them away; in evacuating bile and water, and conſequently curing the jaundice.

HERO, in the antient mythology, a great and illuſtrious perſon, of a mortal nature, though ſuppoſed by the populace to partake of immortality; and, after his death, placed among the number of the gods.

Heroes were perſons partly of divine and partly of human extraction, being begot between a deity and a mortal, and coincides with what we otherwiſe call a demi god; ſuch was Hercules, who was the ſon of Jupiter by Alcmena: accordingly Lucian deſcribes a hero to be a medium between a god and a man, or rather a compoſition of both.

HERO is alſo uſed in a more extenſive ſenſe for a great, illuſtrious, and extraordinary perſonage; particularly in reſpect of valour, courage, intrepidity, and other military virtues.

F. Bouhours makes this diſtinction between a hero and a great man, that the former is more daring, fierce, and enterprizing; and the latter more prudent, thoughtful and reſerved. In this ſenſe we ſay, Alexander was a hero, and Julius Cæſar a great man.

HERO *of a poem, or romance*, is the principal perſonage, or character therein. See the article CHARACTER.

The hero of the Iliad is Achilles; of the Odyſſee, Ulyſſes; of the Æneid, Æneas; of Taſſo's Jeruſalem, Godfrey of Bulloign; of Milton's Paradiſe Loſt, Adam; though Mr. Dryden will have the devil to be Milton's hero, in regard he gets the better of Adam, and drives him out of Paradiſe.

Many of the critics find fault with the hero of the Æneid, for being too delicate, wanting the fire, firmneſs, and uncontroulable ſpirit, remarkable in the hero of the Iliad. Piety, tenderneſs, and ſubmiſſion to the gods, are virtues of the middle claſs of mankind; they do not ſtrike enough for a hero who is to be the inſtrument of ſuch notable exploits. In anſwering to this, F. Boſſu obſerves, that Æneas's character was not to be formed on the model either of Achilles or Ulyſſes; nor to be of the ſame kind with them, as the fable and deſign of the Æneid were very different from thoſe of the Iliad and Odyſſee. Virgil's deſign was to perſuade the Romans to receive a new form of government, and a new maſter; who muſt have all the qualities requiſite for the founder of a ſtate, and all the virtues which make a prince beloved.

Virgil was reſtrained in his choice; his hero was to be of the genius of Auguſtus. The characters of Homer's two heroes, as being directly contrary to his deſign, he has thrown upon Turnus and Mezentius, who are the counter-parts to his hero. It is diſputed whether it be neceſſary, that the hero of an epic poem be a good and virtuous man. Boſſu maintains the negative. Between a hero in morality, and a hero in poetry, the ſame diſtinction may be made as between moral and poetical goodneſs. Hence, as the manners of Achilles and Mezentius are poetically as good as thoſe of Ulyſſes and Æneas, ſo theſe two cruel and unjuſt men are as regular poetical heroes, as theſe two juſt, wiſe, and good men. Whatever Ariſtotle may ſay in his book of morality, in his poetics he ſpeaks another language. The hero of a poem, he obſerves, muſt neither be good nor bad, but between both: he muſt not be ſuperior to the reſt of mankind by his virtue and juſtice, nor inferior to them by his crimes and wickedneſs. In effect, reaſon, the nature of the poem, which is a fable, the practice of Homer, and the rules of Ariſtotle and Horace agree that it is ſo far from being neceſſary, that a hero be a faultleſs man, that it is not neceſſary he be an honeſt man.

It is likewiſe diſputed, whether, the cataſtrophe is neceſſarily to leave the hero happy, or whether it be allowable to leave him unhappy.

The general practice of the heroic poets ſtand for the affirmative. In tragedy according to Ariſtotle unhappy cataſtrophes are preferable to happy ones, an always much better received among th antients.

It is otherwiſe in the epopœia; but ye this does not exclude all unhappy con cluſions. If the poet propoſed his her as a pattern of perfection for imitation the misfortunes falling on him woul ſuit very ill with the deſign; but thi was doubtleſs the fartheſt thing from th intentions of the great maſters of th epopœia. The only reaſon perhaps fo this uniform practice of the poets is that an epic poem containing an actio of more extent than that of tragedy, th reader would not be ſo well ſatiſfied i

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Fig:1. HELLEBORE.

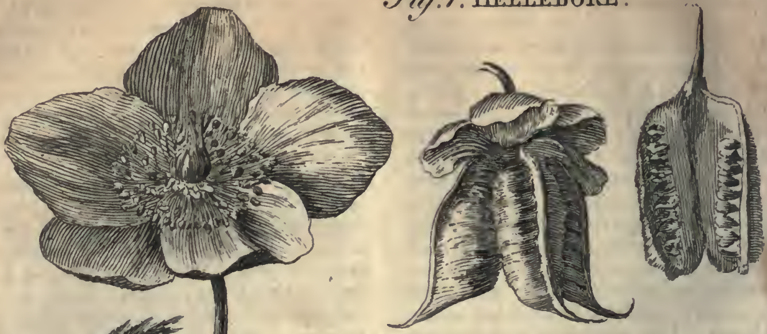


Fig: 2. The *ASH-COLOURED* HERON.

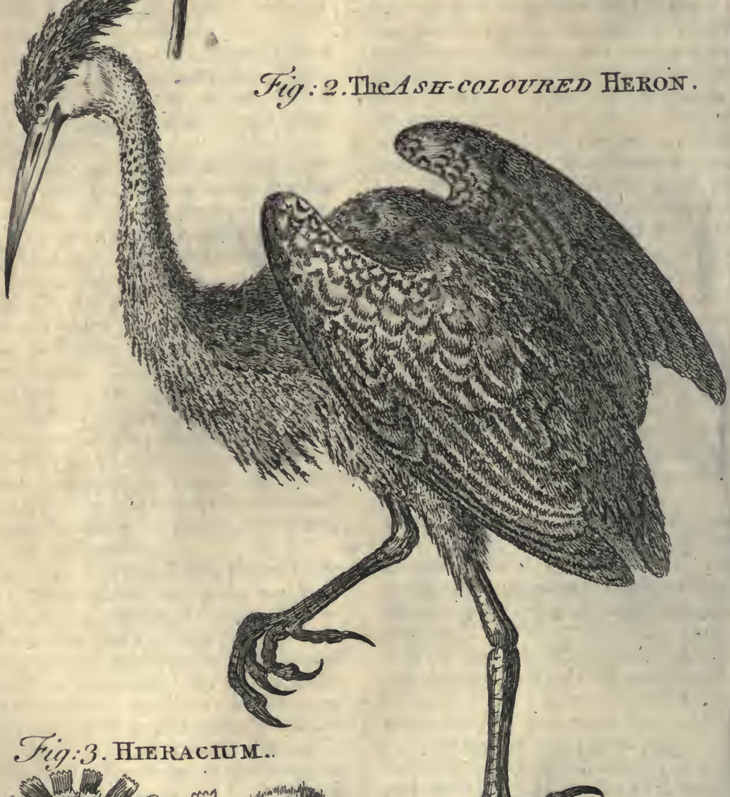
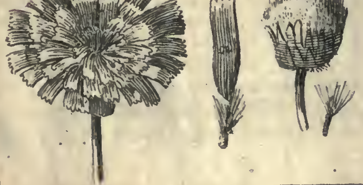


Fig:3. HIERACIUM..



T. Jefferys Sc

after ſo many difficulties as the hero is brought to ſtruggle with, he ſhould not at laſt be brought off, but periſh miſerably.

HEROIC, ſomething belonging to a hero, or heroine: thus,

HEROIC AGE, that age or period of the world wherein the heroes are ſuppoſed to have lived. The heroic age coincides with the fabulous age.

HEROIC POEM, that which deſcribes ſome extraordinary enterprize; being the ſame with epic poem. See EPIC.

HEROIC VERSE, that wherein heroic poems are uſually compoſed; or it is that proper for ſuch poems. In the greek and latin, hexameter verſes are uſually denominated heroic verſes, as being alone uſed by Homer, Virgil, *&c.* See the article HEXAMETER.

Alexandrine verſes of twelve ſyllables were formerly called heroic verſes; but later writers uſe verſes of ten ſyllables.

HEROIN, a woman of an heroic ſpirit, or who makes the principal perſonage in an heroic poem. See HERO and POEM.

HERON, in ornithology, a bird of the ardea-kind, with a hanging creſt.

The common heron is a tall bird, meaſuring more than four feet from the point of the beak to the tip of the toes. Its head is covered with ſhort white feathers; only from the hinder parts, there hangs a creſt of very long black feathers; the upper part of its body is of a duſky bluiſh grey; the under part white, and the thighs yellowiſh.

The aſh coloured heron from Hudſon's Bay differs from the common heron, in being ſomething bigger, of a browner aſh-colour on its back, and in having no white feathers on its forehead. See plate CXXXI. fig. 2.

HERPES, in medicine, a bilious puſtle, which breaking out in different manners upon the ſkin, accordingly receives different denominations.

If they appear ſingle, as they frequently do in the face, the baſe is inflamed, and the top pointed; and having diſcharged a drop of matter, the redneſs and pain go off, and they dry away. There is another ſort more corroſive and of greater malignity, when a cluſter of puſtles riſe in a ring, accompanied with ſmart, and ſometimes with great itching: this ſpecies is termed ſerpigo, and vulgarly the tetter, or ring-worm. It ſeizes the face, hands, and other parts of the body, is of an obſtinate nature, eating into the ſkin; and forſaking the place where it firſt appears, it ſpreads its taint into the adjacent parts. It neither forms matter, nor comes into digeſtion; but when rubbed, will ſometimes emit a thin, ſharp, watery, humour, and excites ſmart, heat, and itching.

Another kind of this diſeaſe appears in large cluſters upon the neck, breaſt, loins, hips, and thighs, attended with a ſlight fever and inflammation: the heads are white and mattery, which are ſucceeded by a ſmall round ſcab, reſembling millet-ſeed, whence its name of herpes miliaris; and is commonly called ſhingles. Another ſpecies, from its degree of virulence and corroſion, is named herpes exedens, or hepes depaſcens. See the article ULCER.

The ſimple bilious puſtle, which riſes in the face, requires but little aſſiſtance from medicine; for though it burns, ſmarts, or itches a day or two, yet it naturally comes to a head, ſoon dies, and diſappears.

The ſerpigo is ſometimes very difficult to be exterminated, and after it appears dead, it will at certain ſeaſons of the year, obſtinately break out again.

Tho' bleeding at firſt is by ſome condemned, yet repeated purging, eſpecially with cholagogue medicines is univerſally approved: theſe not ſucceeding, recourſe muſt be had to mercurials, eſpecially if there be the leaſt ſuſpicion of any old venereal taint remaining in the blood. Having removed the cacochymy, the phyſician may proceed to topics. Ambroſe Paré, after a general evacuation, preſcribes the following. Take of powder of oak-galls, pomegranate-peel, balauſtines, and armenian bole, each half an ounce; of roſe-water, half an ounce; of the ſharpeſt vinegar, half an ounce; of gooſe-greaſe, and oil of myrtles, each ſix drams; of turpentine, half an ounce: make up into an ointment for uſe. Barbet imputes the cauſe of the herpes rather to the lymph, than to the bile and ſalt phlegm, blamed by the antients. In the miliary eruptions, called ſhingles, great care muſt be taken that the bilious cacochymy is purged off before the uſe of topics: the internal preſcription for this purpoſe is the ſame with that in the eryſipelas. See the article ERYSIPELAS. When the puſtles are all ripened, their heads may be cut off with a pair of ſciſſars, and the humours abſorbed with a ſoft rag, to prevent farther corroſion. Then a cerate of oil and wax may be laid over the parts, and kept on with a bandage, to prevent the puſtles ſticking to the dry linen. See ERUPTION.

HERRING, in ichthyology, a ſpecies of clupea, with the lower jaw longeſt, and without any black ſpots. It is from five to eight inches in length, and between one and two in breadth. However, its ſize is far from being certain; ſince it varies not only on account of age, but according to the ſeas and places where it is caught. The back is of a duſky bluiſh colour, and is more blue in ſpring than any other times; the ſides and the belly are of a ſilvery white; the fin on the back ſtands near the middle, and is of a whitiſh colour, and has nineteen rays; the pectoral fins are whitiſh, ſtand low, and have each eighteen rays; the ventral fins are very ſmall and white; the pinna ani is near the tail, and has eighteen rays; the tail is of a greyiſh colour, forked, and furniſhed with eighteen rays.

We have been deſignedly particular in the deſcription of this uſeful fiſh; the manner of fiſhing and curing which is delivered under the article FISHERY.

Barrelling of HERRINGS. See the article *Herring* FISHERY.

HERRING BUSS, in naval affairs. See the article BUSS.

HERSE, in fortification, is a lattice or portcullice, made in the form of a harrow, and ſtuck full of iron-ſpikes.

It is uſually hung by a rope, faſtened to a moulinet, which is cut in caſe of ſurprize, or when the firſt gate is broken with a petard, to the end that it may fall and ſtop up the paſſage of the gate, or other entrance of a fortreſs.

Theſe herſes are alſo often laid in the roads, with the points upwards, to incommode the march both of the horſe and infantry.

HERSILLAN, in the art of war, is a ſtrong plank or beam, about ten or twelve feet long, ſtuck full of ſpikes on both ſides, and alſo uſed to incommode the march of the infantry or cavalry.

HERSTAL, a town of Germany, in the biſhopric of Liege, ſituated three miles north of the city of Liege: eaſt long. 5° 36′ north lat. 50° 42′.

HERTFORD, or HARTFORD. See the article HARTFORD.

HERWERDEN, a town of Weſtphalia, ſubject to the king of Pruſſia; and remarkable for its proteſtant-nunnery: eaſt longitude 8° 15′, and north latitude 52° 12′.

HESDEN, a town of Artois, near the confines of Picardy, and twenty miles ſouth-weſt of St. Omers.

HESPER, *heſperus*, in aſtronomy, an appellation given to the planet Venus, when ſhe ſets after the ſun. See VENUS.

HESPERIDES, in antiquity, the daughters of Heſperus, brother of Atlas, who kept a garden full of golden apples, guarded by a dragon: but Hercules having laid the dragon aſleep, ſtole away the apples. Others ſay, that they kept ſheep with golden fleeces that were taken away by Hercules.

Some think the heſperides were the daughters of a rich merchant of Miletus, who, on account of their beauty, were guarded by a man called Dragon; and that Hercules, by killing or bribing him, got them away.

HESPERIDES was alſo a name antiently given to the Cape Verd Iſlands. See the article *Cape* VERD.

HESPERIS, DAME'S VIOLET, in botany, a genus of the tetradynamia ſiliquoſa claſs of plants, the corolla of which conſiſts of four cruciform petals, of an oblong figure, of the length of the cup, a little reflex, and ending in ſmall ungues: the fruit is a long pod, plane, compreſſed, ſtriated, bilocular, bivalve, containing ſeveral oval, compreſſed ſeeds.

This plant is antiſcorbutic, and diaphoretic, and very ſerviceable in the aſthma, cough, and convulſions: the outward uſe of it is recommended againſt inflammations, cancers, a gangrene, ſphacelus, and contagious diſeaſes.

HESSE-CASSEL landgraviate, including Wetteravia, is a circle of the Upper Rhine, bounded by Weſtphalia and Brunſwic on the north; by Franconia and Saxony on the eaſt; by the river Maine on the ſouth, and by another part of Weſtphalia, and the electorate of Mentz and Triers on the weſt: it is ſubject to the king of Sweden.

HESSE-DARMSTAT, is bounded by the river Maine, which divides it from Heſſe-Caſſel on the north; by the ſame river on the eaſt; and by the Palatinate on the ſouth and weſt.

HETEROCLITE, among grammarians, one of the three variations in irregular nouns, and defined by Mr. Ruddiman, a noun that varies in declenſion; as *hoc vas, vaſis*; *hæc vaſa, vaſorum*.

Other grammarians take the word heteroclite in a larger ſenſe, applying it to all irregular nouns. See ANOMALOUS.

The heteroclite nouns properly ſo called, or, according to the definition, are only three, *viz. vas, jugerum*, and *domus*.

HETERODOX, in polemical theology, any thing contrary to the faith and doctrines of a true church.

HETERODROMUS VECTIS, in mechanics, a lever, wherein the fulcrum, or point of ſuſpenſion, is placed between the power and the weight. See LEVER. In this kind of lever, the weight is elevated, or raiſed, by the deſcent of the power, and *vice verſa*.

HETEROGENEITY, in phyſiology, that quality or property of bodies, which denominates a thing heterogeneous. See the next article.

The word is alſo uſed for the heterogeneous parts themſelves. In which ſenſe the heterogeneities of a body are the ſame thing with the impurities thereof.

Heterogeneity is a word of a very lax ſignification, and is brought by the chemiſts to ſerve almoſt for any thing they do not underſtand, ſo that the diſagreement or inaptitude to mixture in any body is imputed to the heterogeneity of their parts.

HETEROGENEOUS, or **HETEROGENEAL**, ſomething that conſiſts of parts of diſſimular kinds, in oppoſition to homogeneous. See HOMOGENEOUS.

HETEROGENEOUS, in mechanics, ſuch bodies whoſe denſity is unequal in different parts of their bulk; or they are ſuch whoſe gravities in different parts are not proportionable to the bulks thereof: whereas bodies equally denſe or ſolid in every part, or whoſe gravity is proportionable to their bulk, are ſaid to be homogeneous.

HETEROGENEOUS LIGHT, is, by Sir Iſaac Newton, ſaid to be that which conſiſts of rays of different degrees of refrangibility: thus the common light of the ſun or clouds is heterogeneous; being a mixture of all ſorts of rays.

HETEROGENEOUS NOUNS, one of the three variations in irregular nouns; or ſuch as are of one gender in the ſingular number, and of another in the plural, as *hoc cælum, hi cæli*. Heterogeneous, under which are comprehended, mixed nouns, are ſix-fold, 1. Thoſe which are of the maſculine gender in the ſingular number, and neuter in the plural as *hic tartarus, hæc tartara*. 2. Thoſe which are maſculine in the ſingular number, but maſculine and neuter in the plural, as *hic locus, hi loci, & hæc loca*. 3. Such as are feminine in the ſingular number, but neuter in the plural, *hæc carbaſus, & hæc carbaſa*. 4. Such nouns as are neuter in the ſingular number, but maſculine in the plural, as *hoc cælum, hi cæli*. 5. Such as are neuter in the ſingular, but neuter and maſculine in the plural, as *hoc raſtrum*; *hi raſtri, & hæc raſtra*; and, 6. Such as are neuter in the ſingular, but feminine in the plural number, as *hoc epulum, hæ epulæ*.

HETEROGENEOUS NUMBERS, mixed numbers conſiſting of integers and fractions. See INTEGER and FRACTION.

HETEROGENEOUS QUANTITIES, are thoſe which are of ſuch different kinds, as that one of them taken any number of times, never equals or exceeds the other.

HETEROGENEOUS SURDS, are ſuch as have different radical ſigns, as $\sqrt[2]{aa}$, $\sqrt[5]{bb}$, $\sqrt[3]{9}$, $\sqrt[7]{18}$, *&c.* See SURD.

If the indices of the powers of the heterogeneous ſurds be divided by their greateſt common diviſor, and the quotients be ſet under the dividends; and thoſe indices be multiplied croſswiſe by each others quotients; and before the products be ſet the common radical ſign $\sqrt{}$, with its proper index; and if the powers of the given roots be involved alternately, according to the index of each others quotient, and the common radical ſign be prefixed before thoſe products, then will thoſe two ſurds be reduced to others, having but one common radical ſign. As to reduce

$$\sqrt[2]{aa} \text{ and } \sqrt[4]{bb}$$

$$2)\sqrt{aa}\ (2 \quad \sqrt[4]{bb} \quad {}^{1}\times{}^{2}$$

$$\sqrt[4]{bb} \quad \sqrt[4]{aaaa}$$

HETEROPYRÆ, in natural hiſtory, a genus of foſſils, of the claſs of the siderochita, compoſed of various cruſts, ſurrounding a nucleus of a different ſubſtance from themſelves, and often looſe and rattling in them. See the article SIDEROCHITA.

Of this genus Dr. Hill reckons ſeven ſpecies. 1. The hard heteropyra, with brown and purpliſh cruſts, and a whitiſh green nucleus, being a very beautiful foſſil of a ſmooth equal texture, conſiderably compact and cloſe, generally determinate and regular in ſhape and ſize, in form of an oblong oval figure, and about an inch in length, and half an inch in diameter. 2. The rough purpliſh heteropyra, containing a large nucleus of a very light earth. 3. The miſhapen heteropyra, with ferrugineous, red, and duſky, yellow cruſts, and a greeniſh, white nucleus. 4. The yellow, brown, and black cruſted heteropyra, with a whitiſh nucleus, being about four inches in length, and three in breadth, and two and a half in thickneſs, of an oblong form, a cloſe compact texture, and very heavy. 5. The yellow, ferrugineous, and purpliſh-cruſted heteropyra, with a pale yellow nucleus, from four to twelve inches in length, and about the third of its length in breadth, and nearly the ſame in thickneſs. 6. The coarſe, yellow, and brown heteropyra, with a browniſh yellow nucleus of an orbicular form, and between one and two inches in diameter. 7. The coarſe heteropyra, with brown, black, and orange-coloured cruſts, and a yellow nucleus, being of an oblong form, and about an inch and a half in length.

HETEROSCII, in geography, a term of relation denoting ſuch inhabitants of the earth as have their ſhadows falling but one way, as thoſe who live between the tropics and polar circles, whoſe ſhadows at noon, in north latitude, are always to the northward; and in ſouth latitude, to the ſouthward.

Thus we who inhabit the northern temperate zone, are heteroſcii with regard to thoſe who inhabit the ſouthern temperate zone, and they are heteroſcii with reſpect to us. Hence it follows, that only the inhabitants of the two temperate zones are heteroſcii, though in reality there is always one part of the torrid zone whoſe inhabitants are heteroſcii with reſpect to thoſe of the reſt, and with regard to thoſe of one of the temperate zones, except at the time of the ſolſtice, and even at this time all of the torrid zone are heteroſcii with regard to thoſe of one of the temperate zones; but as the people of the torrid zone have their ſhadows now on this, and then on that ſide, they are called amphiſcii. See AMPHISCII.

HETEROUSIANS, a name compoſed of ετερος, other, and ȣσία, ſubſtance, being given to a ſect of Arians, who did not believe that the ſon of God was of a ſubſtance like to that of the father, which was the opinion of another branch of the Arians, who were from thence called hemoouſians; but that he was of another ſubſtance, different from that of the father.

HEUCHERA, in botany, a genus of the pentandria-digynia claſs of plants, the corolla whereof conſiſts of five petals inſerted into the edge of the cup; they are of the length of the cup, and of an ovato-linear figure: the fruit is an ovato-acuminated capſule, ſemibifid, terminating in two reflex points, and containing two cells: the ſeeds are numerous and ſmall.

HEW-HOLE, in ornithology, a name given to the wood-pecker, from its making holes in trees.

HEXACHORD, in antient muſic, a concord called by the moderns a ſixth.

Guido divides his ſcale by hexachords, and there are ſeven contained in it, three by B *quadro*, two by B *natural*, and two B *molle*; and it is for this reaſon that he divided his ſcale into ſix columns, in which he diſpoſed the hexachords. See the article GAMUT.

The hexachord is two-fold, greater and leſs. The greater hexachord is compoſed of two greater tones, and two leſs, and one greater ſemitone, which make five intervals. The leſs hexachord is of two greater tones, one leſſer, and two greater ſemitones. See TONE, *&c.*

HEXAEDRON, or HEXAHEDRON. See the article HEXAHEDRON.

HEXÆDROSTYLA, in natural hiſtory, a genus of foſſils conſiſting of cryſtalliform columnar ſpars, terminated at their ſummit by a pyramid, but adhering irregularly to ſome other body at their baſe. See the article SPAR.

There are three ſpecies of this genus of foſſils. 1. The ſlender hexædroſtylum, with a long pyramid, being ſo pure and clear a ſpar, and ſo much of the ordinary figure of the hexangular cryſtal, that there is no doubt but it has often been miſtaken for cryſtal: its moſt frequent ſize is nearly two inches in length, and a third of an inch in thickneſs, the pyramid being about one fourth of that length. 2. The hexædroſtylum, with a long irregular pyramid, being of a moderately equal, but ſomewhat coarſe and impure texture, and ſubject to ſpots of various earths and minerals, and often ſo altered by them, as not to be known, but by its figure, which it ever keeps regularly to: it is naturally of a duſky white, but moderately tranſparent, conſiderably heavy, and very ſoft. 3. The hexædroſtylum, with a very ſhort pyramid, being uſually of a very pure, clear, and fine texture, but ſometimes ſo debaſed by earthy admixtures, that it becomes very coarſe, and frequently ſpotted, flawed and blemiſhed: it is of various ſizes, but about an inch and a half is its moſt frequent length, and with that the uſual proportion is about half an inch in thickneſs, and the pyramid ſeldom takes up more than one eighth of the length.

HEXAGON, in geometry, a figure of ſix ſides and angles; and if theſe ſides and angles be equal, it is called a regular hexagon.

The ſide of every regular hexagon, inſcribed in a circle, is equal in length to the radius of that circle. Hence, it is eaſy, by laying off the radius ſix times upon the circumference, to inſcribe an hexagon in a circle.

To deſcribe a regular hexagon on a given right line A B (plate CXXIX. fig. 3.) draw an equilateral triangle A C B, and the vertex C will be the center of a circle which will circumſcribe the hexagon required A B D E F G.

As 1 is to 1.672, ſo is the ſquare of the ſide of any regular hexagon to the area thereof, nearly.

HEXAGON, in fortification, is a place defended by ſix baſtions.

HEXAHEDRON, in geometry, one of the five platonic bodies, or regular ſolids; being the ſame with a cube. See CUBE.

HEXAMETER, *carmen hexametrum*, in antient poetry, a kind of verſe conſiſting of ſix feet; the firſt four of which may be indifferently, either ſpondees or dactyls; the fifth is generally a dactyl, and the ſixth always a ſpondee. Such is the following verſe of Horace:

1 2 3 4 5 6
Aut pro|deſſe vo|lunt, aut | dele|ctare po|etæ.

Or this one of Homer:

1 2 3 4 5 6
Σκήπτρω|μέν τοι|δῶκε τε|τίμῆ|σθαι πέρι|πὰντων.

Sometimes indeed, a ſpondee conſtitutes the fifth foot; whence ſuch hexameter verſes are called ſpondaic; as in this of Virgil.

1 2 3 4 5
Cara De|um ſobo|les ma|gnum Jovis|incre-|
6
mentum.

Epic poems, as the Iliad, Æneid, &c. conſiſt wholly of hexameter verſes; whereas elegies and epiſtles conſiſt uſually of hexameter and pentameter verſes, alternately.

Such hexameter verſes pleaſe moſt, wherein dactyls and ſpondees follow each other in an alternate order: and next to theſe, ſuch as abound moſt with dactyls, as:

1 2 3 4 5
Ludere | quæ vel|lem cala|mo per | miſit a-|
6
greſſi
Adſpicis| ut veni|ant ad |candida|tecta co-|
lumbæ.

HEXANDRIA, in botany, a claſs of plants, the ſixth in order; comprehending all thoſe plants which have hermaphrodite flowers, and ſix ſtamina in each. See FLOWER and STAMINA.

To this claſs belong the narciſſus, garlic, daffodil, lilly, &c.

HEXAPLA, in church-hiſtory, a work publiſhed by Origin, containing a part of the Old Teſtament in the original hebrew, with ſeveral verſions of it in ſix columns; from whence it was called hexapla, or the ſix-fold edition.

HEXAPYRAMIDES, in natural hiſtory, a genus of ſpars formed into pyramids, compoſed of ſix ſides or planes, affixed to no column, but adhering to ſome ſolid body by the baſes of their pyramids. See the article SPAR.

HEXASTYLE, in architecture, a building with ſix columns in front.

HEXHAM, a market town of Northumberland, ſixteen miles weſt of Newcaſtle.

HEYDON, a borough town in Yorkſhire, thirty-ſeven miles ſouth-eaſt of York, and ſix miles weſt of Hull. It ſends two members to parliament.

HEYLINGENSTAT, a town of Germany in the circle of Upper Saxony; ſubject to the elector of Mentz: eaſt long. 10°, north lat. 51° 27′.

HEYLSHEM, a town of the Auſtrian Netherlands, in the province of Brabant, ſituated five miles ſouth of Tirlemont: eaſt long. 4° 55′, north lat. 50° 53′.

HEYRS, in huſbandry, young timber-trees uſually left for ſtandards, in the felling of woods or copſes.

HEYTSBURY a borough town of Wiltſhire, fourteen miles north-weſt of Saliſbury, ſends two members to parliament.

HIÆNA, or HYÆNA, in zoology. See the article HYÆNA.

HIATICULA, the SEA-LARK, in ornithology, a ſpecies of charadrius, with a black front, and a white line on it. See the article CHARADRIUS.

It is a very pretty bird, about the ſize of the common lark, or a little larger. The upper part of its body is grey, and the belly white.

HIATUS, properly ſignifies an opening, chaſm, or gap; but it is particularly applied to thoſe verſes, where one word ends with a vowel, and the following word begins with one, and thereby occaſion the mouth to be more opened, and the ſound to be very harſh.

The term hiatus is alſo uſed in ſpeaking of manuſcripts, to denote their defects, or the parts that have been loſt or effaced.

HIBISCUS, in botany, a genus of the monadelphia polyandria claſs of plants, the corolla whereof conſiſts of five petals, vertically cordated, having one prominence of the apex greater than the other, and coaleſcing at the baſe: the fruit is roundiſh, and contains five cells: the ſeeds are kidney-ſhaped.

The ſeveral ſpecies of this plant are in engliſh called the chineſe-roſe, the abelmoſch, the bladder alcea, and the gum-leaved-ketmia.

The ſeeds of the abel-moſch were once kept in our ſhops, as a provocative and cordial; but they are now out of uſe.

HICUP, or **HICCOUGH**, in medicine, a ſpaſmodic affection of the ſtomach and diaphragm, ariſing from any thing that irritates and vellicates their nervous coats. When it proceeds from a ſlight error in diet, it will ſoon end ſpontaneouſly, or by drinking any thing which dilutes the acrid matter; but it is ſometimes of a more dangerous kind, and may proceed from a hurt of the ſtomach, poiſon, an inflammation of the ſtomach, inteſtines, diaphragm, bladder, or the reſt of the viſcera. Sometimes, immediately before death, it may proceed from gangrenes of the outward parts. In acute fevers, and chiefly the malignant, it is often fatal.

When it happens in old or weak people from a plentiful meal, eſpecially from hard and flatulent aliment, or from drinking cold liquors, a draught of generous wine, or a dram of any ſpirituous liquor, will generally take it away. Stomachic powders mixed with peruvian bark, and taken in generous wine, are alſo profitable. When it proceeds from acid humours in the ſtomach, abſorbent and alkaline medicines are good. If it proceeds from an acute fever, or an inflammation of the ſtomach, it is a dangerous diſeaſe: however, dulcified ſpirit of nitre, joined to an alexipharmic, and given often, is proper; or a dram of diaſcordium given in the evening, may perform a cure. If it proceeds from a gangrene or mortification, it is generally incurable; but peruvian bark, with medicines againſt internal inflammations, are moſt likely to ſucceed. If it is cauſed by poiſon, plenty of milk muſt be taken with oil.

Fuller declares, that he does not know a better medicine than the julep of muſk; and Allen ſays, that this affords, one would almoſt think, ſupernatural aſſiſtance.

HICKWALL, or **WITWALL**, in ornithology, names uſed in ſeveral parts of the kingdom for the leſſer black and white woodpecker, with the three lateral long feathers of the tail variegated at the top. It is a ſmall bird, hardly weighing more than an ounce. See the articles PICUS and WOODPECKER.

HIDAGE, in law-books, an extraordinary tax antiently paid to the king for every hide of land. Sometimes, indeed, it is uſed for being quit of this tax.

HIDE, the ſkin of beaſts, but particularly applied to thoſe of large cattle, as bullocks, cows, horſes, *&c.* See the article SKIN.

Hides are either raw or green, juſt as taken off the carcaſe; ſalted or ſeaſoned with ſalt, alum, and ſalt-petre, to prevent their ſpoiling; or curried and tanned. See the article CURRYING, TANNING, *&c.*

Hides make a conſiderable article of commerce, being ſubject to the following duties and drawbacks, on importation, and when exported again. Buff-hides pay each 3 s. $9\frac{60}{100}$d. and draw back 3 s. $6\frac{75}{100}$d. and beſides pay for every pound weight 7 d. and draw back $4\frac{66\frac{2}{3}}{100}$d. Cow or horſe-hides in the hair, pay each $7\frac{18\frac{1}{8}}{100}$d. and draw back $6\frac{46\frac{7}{8}}{100}$d. ditto tanned, pay each 2 s. $4\frac{72\frac{1}{2}}{100}$d. draw back 2 s. $1\frac{87\frac{1}{2}}{100}$d. and for every pound weight $3\frac{50}{100}$d. draw back $2\frac{33\frac{1}{3}}{100}$d. Cow-hides of Barbary and Muſcovy pay each $7\frac{18\frac{1}{8}}{100}$d. draw back $6\frac{46\frac{7}{8}}{100}$d. And beſides if dreſſed in oil, for every pound weight 7 d. draw back $4\frac{66\frac{2}{3}}{100}$d. if tanned, the pound weight $3\frac{50}{100}$d. draw back $2\frac{33\frac{1}{3}}{100}$d. if tawed, the hide 3 s. 6 d. draw back 2

2 s. 4 d. India hides pay each $11\frac{96\frac{7}{9}}{100}$ d. draw back $10\frac{78\frac{1}{8}}{100}$ d. and beſides if dreſſed in oil, for every pound weight 7 d. draw back $4\frac{66\frac{2}{3}}{100}$ d. if tanned, for each pound $3\frac{50}{100}$ d. draw back $2\frac{33\frac{1}{3}}{100}$ d. if tawed, for each hide 3 s. 6 d. draw back 2 s. 4 d. Hides of horſes, mares and geldings, pay for every 20 s. of their value upon oath 4 s. $9\frac{45}{100}$ d. draw back 4 s. $3\frac{75}{100}$ d. and beſides for every hide, 2 s. draw back 1 s. 4 d. Loſh hides pay each 1 s. $10\frac{80}{100}$ d. draw back 1 s. $9\frac{37\frac{1}{2}}{100}$ d. and beſides for every pound weight, 7 d. draw back $4\frac{66\frac{2}{3}}{100}$ d. Red or Muſcovy hides tanned, coloured, or uncoloured, pay each 1 s. $7\frac{15}{100}$ d. draw back 1 s. $5\frac{25}{100}$ d. and beſides for every pound weight, 3 d. draw back 2 d. All other hides, and pieces of hides, not above particularly charged, pay for every 20 s. value upon oath, 4 s. $\frac{45}{100}$d. draw back 4 s. $3\frac{75}{100}$ d. and if tanned, for every pound weight, $3\frac{50}{100}$ d. draw back $2\frac{33\frac{1}{3}}{100}$ d. if dreſſed in oil, for each pound 7 d. draw back $4\frac{66\frac{2}{3}}{100}$ d. and if tawed, each hide pays 3 s. 6 d. and draws back 2 s. 4 d.

For the duty on britiſh hides, tanned, *&c.* See the articles EXCISE, LEATHER, PARCHMENT, *&c.*

Hides and calves-ſkins, tanned in Great Britain, draw back, upon due exportation, two third parts of the duties originally paid for them; and beſides a farther allowance of one penny for every pound weight of ſkin ſo dreſſed, there is a draw-back of 1½ d. for every pound weight manufactured into boots, ſhoes, gloves, *&c.*

HIDE *of land*, was ſuch a quantity of land as might be plowed with one plough within the compaſs of a year, or ſo much as would maintain a family; ſome call it ſixty, ſome eighty, and ſome an hundred acres.

The diſtribution of this kingdom by hides of land is very antient, mention being made of it in the laws of king Ina. Henry I. had three ſhillings for every hide of land, in order to raiſe a dowry for his daughter: this tax was called hidage.

HIDE-BOUND, among farriers, a diſtemper in horſes when the ſkin ſticks ſo faſt to the back and ribs, that the hand cannot ſeparate the one from the other without great difficulty: his body is at the ſame time lean, his back-bones ſtand up, his guts are for the moſt part deficient in moiſture, and his dung dry and more offenſive than common.

If a horſe become hide-bound by hard riding and ill keeping, he may be cured by good keeping. If it be the effect of a fever, or ſome other diſeaſe, if that be cured which is the cauſe, the effect will ceaſe: but if he has no fever upon him, and he is hide-bound only from lowneſs of blood and ſpirits, give him boiled barley, white-water, or the like, and when his fleſh is raiſed, harden it with good oats, beans, and moderate exerciſe.

HIDEL, in old law-books, denotes a ſanctuary or place of protection.

HIDROTICS, in medicine, the ſame with ſudorifics. See SUDORIFIC.

HIERACIUM, HAWKWEED, in botany, a genus of the ſyngeneſia-polygamia-æqualis claſs of plants, the compound flower of which is imbricated and uniform, conſiſting of a great number of equal, hermaphrodite corollulæ, which are linear, truncated, and quinquedentated: the ſtamina are five very ſhort capillary filaments: the ſeeds are ſolitary, obtuſely quadragonal, and winged with down. See plate CXXXI. fig. 3.

The leaves of this plant are eſteemed cooling, and good in inflammations. They likewiſe ſtrengthen the ſight.

HIERACITES, *hieracitæ*, in church-hiſtory, chriſtian heretics in the third century, ſo called from their leader Hierax, a philoſopher of Egypt; who taught that Melchiſedec was the holy ghoſt, denied the reſurrection, and condemned marriage: he likewiſe held, that no one could be ſaved who died before he arrived at years of diſcretion. The diſciples of Hierax taught that the word, or ſon of God, was contained in the father, as a little veſſel is contained in a great one; from whence they had the name metangimoniſts, from the greek word μεταγγμονος, which ſignifies contained in a veſſel.

HIERA PICRA, in pharmacy, a powder prepared in the following manner: take of the gum extracted from ſocotrine aloes, one pound; of winter's bark, ſo called, three ounces; powder them ſeparately, and then mix them.

Species of HIERA PICRA, according to Quincy, is made thus: take of cinnamon, zedoary, aſarum, the leſſer cardamom ſeeds, and ſaffron, of each ſix drams; cochineal, a ſcruple; of the beſt aloes, twelve ounces; and let them all be made into a powder together.

Simple HIERA PICRA, is made by mixing the ſpices of hiera picra with deſpumated honey, or ſyrup of violets, into an electuary.

Tincture of HIERA PICRA, is made thus: take of the ſpecies of hiera picra, one ounce; of white-wine, one pound; digeſt and then ſtrain off the fine liquor. It may be made in the ſame manner with a french ſpirit.

This may be ſo managed as to become a good alterant. It is generally given over night from two to three ounces; and ſometimes only one ſpoonful at night, and it produces excellent effects in a cachexy, chloroſis, and obſtructions of the menſes.

HIERARCHY, among divines, denotes the ſubordination of angels. See the article ANGEL.

Some of the rabbins reckon four, others ten, orders or ranks of angels; and give them different names, according to their different degrees of power and knowledge. Dionyſius the areopagite, the jeſuit Celert, and many others, have gone ſo far as to ſettle a kind of ceremonial or rule for the precedency of angels, as ſeraphim, cherubim, thrones, dominions, principalities, &c.

HIERARCHY likewiſe denotes the ſubordination of the clergy, eccleſiaſtical polity, or the conſtitution and government of the chriſtian church, conſidered as a ſociety.

The nature of this polity will be beſt underſtood, by looking back to the conſtitution of the antient chriſtian church; which, as a ſociety, conſiſted of ſeveral orders of men, *viz.* ἡγȣμενοι, πιϛοι, and κατηχȣμενοι; that is, rulers, believers, and catechumens.

Under the rulers are comprehended the whole body of the clergy, *viz.* biſhops, prieſts, and deacons. See the articles BISHOP, PRIEST, &c.

The believers were perfect chriſtians, and the catechumens imperfect. See the articles CHRISTIANS and CATECHUMEN.

It has been pretended, ſays Broughton, that the biſhops and preſbyters were the ſame, which opinion has given riſe to the preſbyterians. See PRESBYTERIANS.

The biſhops, preſbyters, and deacons, therefore, according to him, conſtituted the three ſuperior orders of the clergy; beſides whom there were ſeveral inferior orders, as ſubdeacons, acoluthiſts, exorciſts, readers, door-keepers, ſingers, catechiſts, ſtewards, &c. See the article ACOLUTHI, &c.

All theſe orders of the clergy, continues the ſame author, were appointed to their ſeveral offices in the church, by ſolemn forms of conſecration or ordination, and had their reſpective privileges, immunities, and revenues: and by means of this gradation and ſubordination in the hierarchy, the worſhip and diſcipline of the primitive church were kept up.

How far the conſtitution of our own churches agrees with or has departed from the plan of the antient hierarchy, may be ſeen at one glance of the eye. We have the firſt general diſtinction of biſhops, preſbyters or prieſts, and deacons. Among the firſt, we retain only the diſtinction of archbiſhops, with the title likewiſe of primates and biſhops; having no patriarchs or chorepiſcopi: but as to the inferior orders of the clergy, as acoluthiſts, &c. they are all unknown to the church of England.

The unity and order of the chriſtian church were ſecured by laws both eccleſiaſtical and civil. The eccleſiaſtical laws were, either rules and orders made by each biſhop for the better regulation of his particular dioceſe; or laws made in provincial ſynods, for the government of all the dioceſes of a province; or, laſtly, laws reſpecting the whole chriſtian church made in general councils. See SYNOD.

The civil laws of the church, were the edicts made from time to time by the emperors, either reſtraining the power of the church, granting it new privileges, or confirming the old; and the breach of theſe laws were ſeverely puniſhed both by the church and ſtate.

HIERES, a town of Provence, in France, ſituated on the Mediterranean, eight miles eaſt of Toulon: eaſt long. 6° 5′, north lat. 43° 5′.

HIERES is alſo the name of ſeveral iſlands ſituated in the Mediterranean, near the coaſt of France, oppoſite to the towns of Hieres and Toulon.

HIEROGLYPHICS, in antiquity, myſtical characters, or ſymbols, in uſe among the Egyptians, and that as well in their writings as inſcriptions; being the figures of various animals, the parts of human bodies, and mechanical inſtruments.

But beſides the hieroglyphics in common uſe among the people, the prieſts had certain myſtical characters, in which they wrapped up and concealed their doctrines from the vulgar. It is ſaid, that theſe ſomething reſembled the chineſe characters, and that they were the invention of Hermes. Sir John Marſham conjectures, that the uſe of theſe hieroglyphical figures of animals, introduced the ſtrange worſhip paid them by that nation: for as theſe figures were made choice of, according to the reſpective qualities of each animal, to expreſs the qualities and dignity of the perſons repreſented by them, who were generally their gods, princes and great men, and being placed in their temples, as the images of their deities; hence they came to pay a ſuperſtitious veneration to the animals themſelves.

The meaning of a few of theſe hieroglyphics, has been preſerved by antient writers. Thus we are told they repreſented the ſupreme deity by a ſerpent with the head of a hawk. The hawk itſelf was the hieroglyphic of Oſiris; the river-horſe, of Typhon; the dog, of Mercury; the cat, of the moon, or Diana; the beetle, of a couragious warrier; a new-born child, of the riſing ſun; and the like.

HIEROGRAMMATISTS, ἱερογραμματεις, *i. e.* holy regiſters, were an order of prieſts among the antient Egyptians, who preſided over learning and religion.

They had the care of the hieroglyphics, and were the expoſitors of religious doctrines and opinions. They were looked upon as a kind of prophets, and it is pretended that one of them predicted to an egyptian king, that an Iſraelite, (meaning Moſes) eminent for his qualifications and atchievements, would leſſen and depreſs the egyptian monarchy. They were thought to be ſkilled in amulets and charms, in aſtrology and augury: by this means they had a great ſway in the egyptian ſenate or council, and were always at court to aſſiſt the king with their advice. They were exempted from the public taxes, were eſteemed of the higheſt quality, and bore a ſcepter like the king's: but after the conqueſt of Egypt by the Romans, they became very inconſiderable, and dwindled into mere fortune-tellers. They wore a linen coat, and paper-ſhoes; they bathed thrice a day and twice in the night in cold water, and in their religious worſhip uſed to beat and diſcipline themſelves very ſeverely.

HIEROMANCY, ἱερομαντεια, in antiquity, that part of divination which predicted future events from obſerving the various things offered in ſacrifice. See Divination and Sacrifice.

HIEROMENIA, in antient chronology, a corinthian month, commonly called panemos; being the ſame with the athenian boedromion.

HIEROMNEMON, the name of an officer in the greek church, whoſe principal function it was to ſtand behind the patriarch at the ſacraments, and other ceremonies of the church, and to ſhew him the prayers, pſalms, &c. in the order in which they were to be rehearſed. He likewiſe aſſiſted the patriarch in putting on his pontifical veſtments; and aſſigned their places to thoſe who ſat round him, when ſeated on his throne. This office, in this latter reſpect, was the ſame as that of maſter of the ceremonies to the pope. The hieromnemon was commonly a deacon.

HIEROPHANTES, in grecian antiquity, the name by which the Athenians called thoſe prieſts and prieſteſſes who were appointed by the ſtate to have the ſuperviſal of things ſacred, and to take care of the ſacrifices.

They were obliged to the ſtricteſt continency, in regard to the dignity of their miniſtry; for which reaſon they drank decoctions of hemlock, to extinguiſh carnal deſires.

The ceremonies of initiation, into the myſterious rites of Ceres, was performed by the hierophantes; whoſe names were held in ſuch veneration, that the initiated were expreſsly forbidden to mention them in the preſence of the profane.

HIEROPHYLAX, an officer in the greek church, who was guardian or keeper of the holy utenſils, veſtments, &c. anſwering to our ſacriſta or veſtry-keeper.

HIEROSCOPY, the ſame with hieromancy. See Hieromancy.

HIGH, *altus*, a term of relation, importing one thing's being ſuperior or above another: thus we ſay, a high mountain, the high court of parliament, high relievo, &c. See the articles Mountain, Parliament, &c.

High, in muſic, is ſometimes uſed in the ſame ſenſe with loud, and ſometimes in the ſame ſenſe with acute.

High *bearing cock*, a term uſed in ſpeaking of fighting cocks, for one that is larger than the cock he fights with.

High-water, the ſtate of the tide when higheſt, or the time juſt before it begins to ebb. See the article Tides.

High-way, a free paſſage for the king's ſubjects, on which account it is called the king's high-way, tho' the freehold of the ſoil belong to the lord of the manor, or the owner of the land. Thoſe ways that lead from one town to another, and ſuch as are drift or cartways, and are for all travellers in great roads, or that communicate with them, are high-ways only; and as to their reparation, are under the care of ſurveyors.

By the 2 & 3 Phil. & Mar. c. 8. it is enacted, that conſtables and church-wardens of pariſhes, calling the pariſhioners together, ſhall yearly elect two honeſt perſons to be ſurveyors of the high-ways, who are thereby authorized to order and direct the perſons and carriages employed in amending them: and the perſons ſo choſen, are to take upon them the execution of the office, on pain of forfeiting 20 s. The ſame ſtatute has farther ordained, that certain days ſhall be appointed for working on the repairs of high-ways, on which every perſon having a plough-land, or keeping a draught or plough, is to ſend out one cart, provided with horſes, tools, &c. and two able men attending; alſo clergymen, keeping a coach and horſes, ſhall be obliged to ſend out a team, or ſhall forfeit 10 s. for every default therein: and every houſeholder or cottager ſhall work on the ſaid days, for the amendment of the high-ways, under the penalty of 1 s. 6 d. a day, leviable by diſtreſs, &c. Where a high-way lies within a pariſh, the pariſh is bound to repair it, unleſs it appears that the ſame ought to be repaired by ſome perſon, either by reaſon of tenure or preſcription. On oath made, by the ſurveyors, of ſums expended in repairing any high-way, juſtices of the peace may order them a rate not exceeding 6 d. in the pound; but money thus raiſed, ſhall not excuſe working on the high-ways, where the ſtatute-work and labour has not been performed. 3 & 4. Wil. & Mar. If a high-way leading through a field is out of repair, travellers may juſtify going out of the track, tho' there be corn ſown; and in caſe a high way is not ſufficient, any paſſenger may break down the incloſure, and go over the land adjoining, till a ſufficient way be made. All manner of injuries to high ways that render them leſs commodious to travellers, are deemed nuſances; ſuch as laying logs of timber in them, erecting gates, or making hedges acroſs them, permitting boughs of trees to hang over them, &c. Perſons neglecting to ſcour their ditches, whereby the ways are dangerous, after thirty days notice given by the ſurveyors, are liable to the forfeiture of 2 s. 6 d. for every eight yards not ſcoured; and not under 20 s. or exceeding 5 l. if they permit ſoil to lie in the high-ways. Geo. I. c. 52. Poſts with inſcriptions ought to be ſet up by ſurveyors, where two or more croſs roads meet, as a direction to travellers to the next market-towns, on the penalty of 10 s. 8 & 9 Wil. III. 7 Geo. II. c. 9.

High-way-men, are robbers on the high-way, for the apprehending and taking of whom a reward of 40 l. is given by the ſtatute of 4 & 5 Wil. & Mar.

HIGHAM-FERRERS, a borough town of Northamptonſhire, twelve miles north-eaſt of Northampton: it ſends two members to parliament.

HIGHNESS, a title given to princes. Before king James I. the kings of England had no other title but that of highneſs; which was alſo the caſe of the kings of Spain before Charles V.

At preſent all the ſons of crowned heads are ſtiled royal highneſs, as the electors of Germany are electoral highneſs.

HIGHWORTH, or **Higworth**, a market town of Wiltſhire, ſituated thirty miles north of Saliſbury.

HIIS TESTIBUS, a phraſe antiently added in the end of a deed, written in the ſame hand with the deed; upon which the witneſſes were called, the deed read, and their names entered. See the article Witness.

Hiis teſtibus in ſubject deeds, continued till, and in, the reign of Henry VIII.

HILARIA, an antient roman feſtival, obſerved on the eighth of the calends of April, or the twenty-fifth day of March, in honour of the goddeſs Cybele. It was ſo called from the various expreſſions of joy and mirth on this occaſion. The ſtatue of the goddeſs was carried in proceſſion through the ſtreets of the city. The day was ſpent in maſquerades of all ſorts, and every one was permitted to appear in what diſguiſe he pleaſed. The day before the feſtival was ſpent in tears and mourning; the reaſon of which was probably this: Cybele repreſented the earth which, at that time of the year, begins to feel the kindly warmth of the ſpring, and to paſs from winter to ſummer; ſo that this ſudden tranſmutation from ſorrow to joy, was an emblem of the viciſſitude of the ſeaſons, which ſucceeded one another.

HILARODI, in the antient muſic and poetry, a ſort of poets among the Greeks, who went about ſinging little gay poems or ſongs, ſomewhat graver than the ionic pieces, accompanied with ſome inſtrument. From the ſtreets they were at length introduced into the tragedy, as the magodi were into comedy. They appeared dreſſed in white, and were crowned with gold. At firſt they wore ſhoes, but afterwards they aſſumed the crepida; being only a ſoal tied over with a ſtrap.

HILARODIA, a poem or compoſition in verſe, made or ſung by a ſort of rapſodiſts called hilarodi. See the preceding article.

HILARO-TRAGEDIA, a dramatic performance, partly tragic, and partly comic.

Scaliger holds the hilaro-tragedia, and the hilarodia, or poem ſung by the hilarodi, to be the ſame thing. Others rather take the hilaro-tragedia to have been pretty nearly what we call a tragicomedy. Others again will have it to have been a pure tragedy, only terminating with a happy cataſtrophe, which brings the hero out of the wretched into the fortunate ſtate. Suidas mentions one Rhinthon, a comic poet of Tarentum, as the inventor of this kind of poetry.

HILARY-TERM, among lawyers. See the article TERM.

HILDESHEIM, the capital of a biſhopric, ſurrounded by the territories of Brunſwic, and ſubject to its own biſhop: eaſt long. 10°, north lat. 52° 17′.

HILL, in the natural hiſtory of the earth. See the article MOUNTAIN.

HILUM, among botaniſts, denotes the eye of a bean. See BEAN and EYE.

HIN, a hebrew meaſure of capacity for things liquid, containing the ſixth part of an epha, or one gallon two pints, or 2.533 ſolid inches, engliſh meaſure.

HIND, a female ſtag in the third year of its age.

HIND-CALF, a male-hart or hind in the firſt year. She fawns in April or May. See the article HUNTING.

HIND, or HINE. See the article HINE.

HIND HAND, in the manege. See the article HAND.

HINDENI HOMINES, ſignifies a ſociety or claſs of men.

In the time of our Saxon anceſtors, all men were ranked into three claſſes, and rated agreeably to the claſſes they were in; and if any one committed an injury, he was to make reparation according to the value of the perſon to whom it was done. The loweſt were thoſe worth 200 ſhillings, who were called *viri ducenteni*, or *twyhindemen*, and their wives *twyhindas*. The middle were valued at 600 ſhillings, and were termed *ſixhindemen*, and their wives *ſixhindas*: and the higheſt were valued at 1200 ſhillings, and were ſtiled *twelfhindemen*, and their wives *twelfhindas*.

HINDON, a borough town of Wiltſhire, ſituated fourteen miles weſt of Saliſbury: it ſends two members to parliament.

HINDOWN, or HENDOWN, the capital of the country of the Hindowns, in the hither India: eaſt long. 76° 30′, north lat. 27°.

HINE, or HIND, a huſbandman's ſervant. Thus the perſon who overſees the reſt, is called the maſter hine.

HINGES, the joints on which gates, doors, lids, folds of tables, &c. hang and turn in opening, ſhutting, or folding.

They are of different denominations, as butts, uſed by the joiners for hanging table-leaves, &c. (See plate CXXXII. fig. 1. n° 1.) Caſement, for hanging caſements upon (*ibid.* n° 2.) dove-tails, (n° 3.) and eſſes (n° 4.) for light doors and lockers; garnet croſs, for hanging large doors or heavy ſcuttles in ſhips (n° 5.); port, for hanging ſhips ports (n° 6.); ſcuttle, particularly uſed for ſcuttles (n° 7.)

Beſides theſe there are many others of different forms and uſes, diſtinguiſhed by different names, as caſting, cheſt-black Lancaſhire, ſmooth-field coach, deſk, dozen ware long, dozen ware ſhort, weighty long, weighty ſhort, lambs-heads, port ſide Lancaſhire, ſide ſmooth-field, ſide with ſquares, ſide with riſing joints, Lancaſhire and ſmooth-field ſtalls; beds, box, trunk of ſeveral kinds; ſcrew, ſhutter, Lancaſhire joints, and Lancaſhire dozen-ware with hooks.

Hinges of all kinds are prohibited to be imported.

HINGHAM, a market-town, ten miles ſouth weſt of Norwich.

HINKLEY, a market-town, ten miles ſouth of Leiceſter.

HIP, or **HAW**, in the materia medica, is reputed attenuant and diuretic. There is a very pleaſant conſerve of hips kept in the ſhops.

HIP, or **HAUNCH**, among farriers. See the article HAUNCH.

HIP-SHOT, is ſaid of a horſe that has ſprained his haunches. See STRAIN.

HIPS in building, thoſe pieces of timber placed at the corner of a roof.

The hips are much longer than the rafters, by reaſon of their oblique poſition, and are planted not with a right or ſquare angle, but a very oblique one, and conſequently are not, or at leaſt ought not, to be ſquare at any angle, (as rafters are not at all) but level at every one of them; and, which is more, as rafters have but four planes, theſe commonly have five. They are generally by country workmen called corners; and ſome call them principal rafters, and others ſleepers. The truth is, hips and ſleepers are much the ſame, only ſleepers lie in the vallies, (and join at the top with the hips) but thoſe ſurfaces or planes which make the back of the hip, are under the ſides of the ſleeper.

The backs of a hip are thoſe two ſuperficies or planes on the outſide of the hip, which lie parallel, both in reſpect of the length and breadth, with the ſuperficies of the adjoining ſide and end of the roof.

HIP-GOUT, *ſciatica*. See the articles GOUT and SCIATICA.

HIP-MOULD, is by ſome uſed for the back of the hip, but others underſtand it to mean the prototype or pattern, commonly made of a thin piece of wainſcot, by which the back and ſides of the hip are ſet out.

HIP-ROOF, among carpenters, called alſo italian roof, is a roof which has neither gable-head, ſhread-head, nor jerken-head (by which is meant ſuch heads as are both gable and hip at the ſame end:) for it is a gable or upright as high as the collar-beam, and then there are two ſhort hips, which ſhut up with their tops to the tops of a pair of rafters, which country carpenters call ſinglars.

A hip-roof has rafters as long, and with the angles of the foot, *&c.* at the ends of buildings, as it has at the ſides; and the feet of the rafters at the ends of ſuch buildings as have hip-roofs, ſtand on the ſame plane, *viz.* parallel with the horizon, and at the ſame height from the foundation, with rafters on the ſides of the roof.

HIPPARCHUS's PERIOD. See PERIOD.

HIPPEUS, in phyſiology, a kind of comet, ſo called from its reſemblance to a horſe. But the ſhape of this comet is not always alike, being ſometimes oval, and ſometimes imitating a rhomboidos. Its train alſo is ſometimes ſpread from the front, or fore part, and ſometimes from the hind part.

Hence this claſs of comets is diſtinguiſhed into equinus barbatus, equinus quadrangularis, and equinus ellipticus. See the article COMET.

HIPPO, in zoology, a ſpecies of ſerpent, with 160 ſcuta on the abdomen, and 100 ſquamæ on the tail. See COLUBER and SERPENT.

HIPPOBOSCA and **HIPPOBOSCUS**, in zoology, names given to the horſe-fly, frequent about the bodies of horſes, to whom it is very troubleſome.

HIPPOCAMPUS, the SEA HORSE, in ichthyology, the ſquare-bodied ſyngnathus, with no fin at the tail. It is five inches long, and where thickeſt, about an inch in diameter; the head is long, ſlender, and compreſſed, forming a kind of ſnout; the body is of a quadrangular figure, but the diviſions are not equal; and in the thickeſt part it is hexangular or heptangular. See SYNGNATHUS.

It is a very ſingular and rare fiſh; the tail of which uſually curls up in the drying, and its head being bent down, gives it a rude reſemblance to a horſe; whence the name. See plate CXXXII. fig. 3.

HIPPOCASTANUM, HORSE-CHESNUT, the ſame with the eſula of Linnæus. See the article ESULA.

HIPPOCENTAUR, in antiquity, a fabulous animal, half man half horſe.

What gave riſe to the fable of hippocentaurs, was this. The Theſſalians are ſaid to have been the firſt inventors of the art of breaking horſes; and being firſt ſeen on horſeback, they ſeemed to make but one body with the horſes; whence the origin of the fable.

HIPPOCRAS, an infuſion of aromatic powders in wine, which is afterwards edulcorated with ſugar and honey; being ſo called becauſe that, when the infuſion is finiſhed, it is ſtrained through Hippocrates's ſleeve.

It is prepared of various aromatics and other

Fig:1. HINGES.

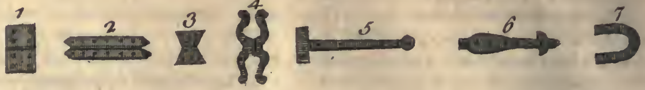


Fig:2. HIPPOPOTAMUS.

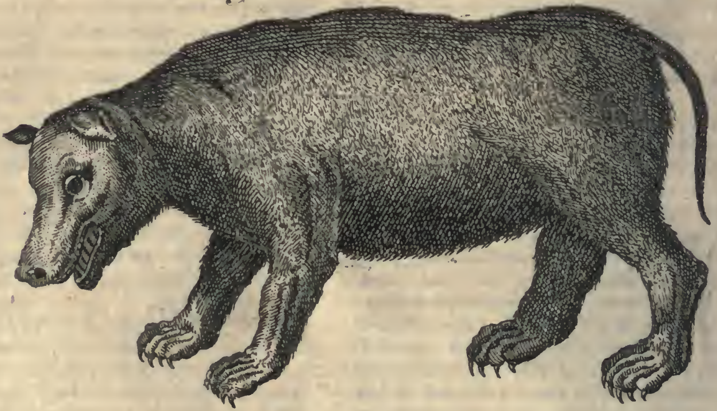


Fig:3. HIPPOCAMPUS.

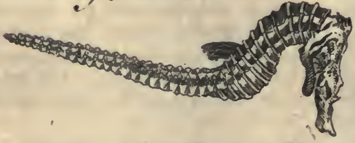
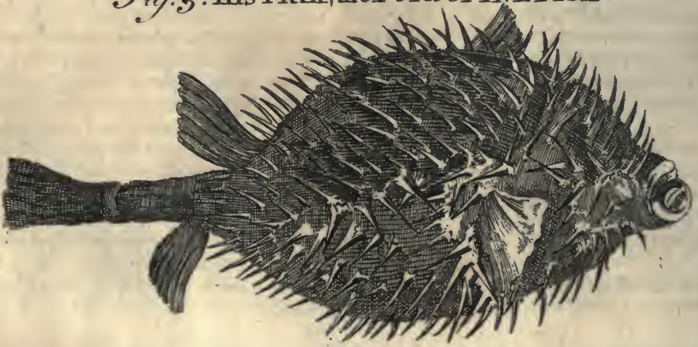


Fig:4. HIRUDO, the *LEECH*

Fig:5. HISTRIX, the *PORCUPINE-FISH.*



T. Jefferys Scu

other ingredients, according to the different intentions to be anſwered.

HIPPOCRATEA, in botany, a genus of plants, whoſe characters are not juſtly aſcertained: the calyx is a perianthium formed of a ſingle leaf, patent, and lightly divided into five obtuſe ſegments, larger than the corolla; the corolla is monopetalous, oval, truncated at the top, and undivided at the edges: the fruit is a capſule of a depreſſo-plane figure, patent, ſemitrifid, with trifid ſegments; and contains three cells, each of them bivalve, and the valves carinato-compreſſed: the ſeeds are oblong, and have a membranaceous ala.

HIPPOCRATES's SLEEVE, a bag uſed to ſtrain ſyrups and decoctions for clarification. See CLARIFICATION.

HIPPOCREPIS, COMMON HORSESHOE VETCH, in botany, a genus of the diadelphia-decandria claſs of plants: the corolla is papilionaceous; the vexillum cordated, ſeated in the ungues the length of the cup; the carina is lunulated and compreſſed: the fruit is a compreſſed plane pod, very long and reflex, and jointed: the ſeed is ſingle in each joint, of an oblong and incurved figure.

HIPPODROME, in antiquity, the courſe where horſe-races were performed.

HIPPODROMUS, in grecian antiquity, the bœotian name for the athenian month hecatombæon. See HECATOMBÆON.

HIPPOGLOSSUS, the TURBOT, in ichthyology, a ſpecies of pleuronectes, with the eyes on the right ſide, and the body ſmooth.

It grows to a conſiderable ſize, and is one of the moſt eſteemed fiſh at our tables. The dorſal-fin reaches from the head to the tail, and has an hundred and five rays; the pectoral fins have each ſixteen rays, and the ventral ones ſix. See the article PLEURONECTES.

HIPPOMANE, in botany, a genus of plants whoſe characters are not properly aſcertained; the male and female flowers are produced diſtinct; the male flower has no corolla: the fruit is a large, globoſe berry, ſomewhat umbilicated, and containing only one cell: the ſeed is round and woody. The eating of this plant is ſaid to make horſes mad, whence its name ἱππομανὲς.

HIPPOMANES ſignifies the expreſſed juice of the tithymallus; as alſo a juice diſtilling from the genitals of a mare, in the time of her covering: ſome again take it for the ſecundines of a mare; and, laſtly, it ſignifies a fleſhy ſubſtance adhering to the forehead of a colt newly foaled, which ſome imagine to have a virtue of procuring love, and promoting the birth.

HIPPOMYRMEX, the HORSE-ANT, in zoology, a ſpecies of ant, much larger than the common ant. See ANT.

HIPPOPHAE, the SWALLOW-THORN, or SEA BUCK-THORN, in botany, a genus of the dioecia-tetrandria claſs of plants, having no corolla; the calyx of the male flowers is divided into two parts, as is alſo the calyx of the female: the fruit is a globoſe, unilocular berry; the ſeed is ſingle and roundiſh.

Hippocrates preſcribes the juice of this plant to evacuate white phlegm; and alſo as a cathartic in other diſorders.

HIPPOPOTAMUS, the RIVER-HORSE, a genus of quadrupeds, of the order of the jumenta, the characters of which are theſe: the fore teeth of the upper jaw are four, and placed in pairs; thoſe of the lower jaw are prominent, and the intermediate ones are protended forward: the canine-teeth are ſingle, and obliquely truncated; the teats are only two, and placed near the groin.

The hippopotamus is a native of Africa, paſſing a great part of its time under water, in the rivers of the Nile and Niger; but comes on ſhore to ſleep and breed. It is a large unweildy animal, as big as an ox. See plate CXXXII. fig. 2.

HIPPURIS, in botany, a genus of the monandria-monogynia claſs of plants, having no corolla: the cup is ſcarce diſtinguiſhable; it conſiſts of only two extremely ſmall margins, ſtanding oppoſite to one another on the head of the germen: there is no pericarpium; but after every flower there comes a ſeed, which is roundiſh and naked.

HIPPURUS, in ichthyology, the dolphin or coryphæna with a forked tail. See the articles DOLPHIN and CORYPHÆNA.

HIRCANIA, in geography, the provinces of Perſia in Aſia, which lie on the ſouthern ſhore of the Caſpian ſea.

HIRCHFIELD, a city of Germany, in the circle of the upper Rhine, and langraviate of Heſſe Caſſel, ſituated on the river Fuld, in eaſt long. 9° 32′, north lat. 50° 47′.

HIRCI, or SANGUIS HIRCI. See the article SANGUIS.

HIRCUS, in anatomy, a part of the auricle or outer ear, being that eminence next the temple. See EAR.

HIRCUS, a GOAT, in aſtronomy, a ſtar of

the firſt magnitude, the ſame with capella. See the article Capella.

Hircus is alſo a name uſed by ſome writers for a comet encompaſſed, as it were, with a mane, ſeemingly rough and hairy.

Hircus, a denomination given to the rank ſmell exhaling from the armpits.

HIRSBURG, a town of Sileſia, in the territory of Jawer, forty-four miles ſouth-weſt of Breſlaw, in eaſt long. 15° 50′, north lat. 50° 50′.

HIRTELLA, in botany, a genus of the triandria-monogynia claſs of plants, the corolla whereof conſiſts of five equal petals: theſe are roundiſh and hollow, ſmaller than the cup, and deciduous: the fruit is an oval berry, broadeſt at the top, a little compreſſed, and obſcurely trigonal: the ſeed is ſingle, and of the figure of the cup.

HIRUDO, the leech, in zoology, a well known naked inſect, with a flatted but not jointed body, and broader at the end than elſewhere, and the ſkin ſoft and gloſſy.

The common leech grows to two or three inches in length, and is of a blackiſh colour, variegated with yellow. See plate CXXXII. fig. 4.

The horſe-leech is larger than the former ſpecies, black on the back, and lead-coloured on the belly. The ſnail-leech, is only about an inch in length, and of a whitiſh colour; and the great-tailed leech grows to an inch and an half in length, and is of a duſky-brown colour. See the article Leech.

HIRUNDO, in ornithology, a genus of birds, of the order of the paſſeres; comprehending the common houſe-ſwallow, the field ſwallow, the martin, and the goat-ſucker.

The characters of the genus are theſe: the beak is very ſmall, of a ſubulated figure, crooked, and depreſſed at the baſe; and the opening of the mouth is enormouſly wide.

The common ſwallow is about the ſize of the linnet: the upper part of the body is of a gloſſy bluiſh-black, the tail-feathers are ſpotted with white, and the breaſt and belly are of a ſnow-white.

Hirundo, the swallow fish or tub-fish, in ichthyology, a ſpecies of trigla, with a ſomewhat prickly head, and with a remarkable pinnule at the pectoral fins: which are ſo long, as to be of uſe in flying, or raiſing itſelf above the water. Hence, by ſome inaccurate writers, it has been confounded with the exocoetus, or flying-fiſh, properly ſo called. See the article Exocoetus.

HISPANIOLA, an iſland of America, in the Atlantic ocean, ſituated between 67° and 74° of weſt long. and between 18° and 20° north lat. being about 420 miles long from eaſt to weſt, and 120 in breadth. It is frequently called St. Domingo, from the capital thereof.

HISPID leaf, among botaniſts, one whoſe ſurface is covered with more thick and rigid hairs than the piloſe leaves are.

Hispid stalk, among botaniſts, a ſtalk roughly hairy.

HISSING letters, among grammarians, are S, X, and Z, ſo called on account of their harſh ſound.

HISTORICAL, ſomething that relates to hiſtory: thus we ſay, hiſtorical truth, hiſtorical ſtyle, hiſtorical narration of facts, *&c.* See the article History.

HISTORIOGRAPHER, a profeſſed hiſtorian, or writer of hiſtory.

An hiſtorian of all authors ſpreads the moſt ample theatre; he erects the greateſt tribunal on earth; for it is his office to ſit ſupreme judge of all that paſſes in the world, to pronounce the deſtiny of the great ones of the earth, and fix their character with poſterity; to do juſtice to virtue and worth, in beſtowing eternity upon great and good actions, and fixing an everlaſting mark of infamy on bad ones; to inſtruct all people and nations, and direct the conduct of ages; he therefore ought to be endowed with many great and uncommon qualifications. He muſt be a perſon of conſummate knowledge of men and things, of ſound judgment, uncommon ſagacity and penetration, experienced in matters of ſtate and war, of great integrity, firmneſs of mind, freedom of ſentiment, and maſter of a pure, clear, nervous, and exalted ſtyle. An hiſtorian whoſe province it is to ſpeak to kings and princes, to the great men of all ages and countries, and to be the common maſter and inſtructor of mankind, muſt not only write with purity, ſimplicity, and manly ſenſe, but with dignity and elegance: he muſt reject all that is vulgar and low in ſtyle, make the majeſty and ſublimity of his expreſſion comport with the dignity of his ſubject; muſt by an exact choice and propriety of words, a natural diſpoſition of phraſes, and a prudent moderate uſe of figures, give weight to his thoughts, force to his language, and imprint a character of greatneſs on all that he ſays. He muſt at the ſame time repreſent things with an air of gravity and prudence, and not give a looſe to the heat of imagination, or vivacity of wit; but diſcreetly ſuppreſs every thing that ſhall ſeem idle, languid, and unprofitable, and give every thing that juſt figure and proportion which is conſiſtent with propriety and decorum. He muſt endeavour at a noble ſimplicity of thought, language, deſign, and ordinance, and carefully avoid all profuſeneſs of falſe conceit, ſtrained expreſſion, and affected pompouſneſs ſo inconſiſtent with the gravity, dignity, and noble character of hiſtory. In a word, he muſt write ſo as to be intelligible to the ignorant, and yet charm the wiſe; form and expreſs ſuch ideas as are great, and yet ſhall appear very common, and intermix no other ornament with his narration than what the modeſty of truth can bear. He ſhould be above the reach and power of hopes and fears, and all kinds of intereſt, that he may always dare to ſpeak the truth, and write of all without prejudice; religiouſly obſerving never to abuſe the public faith, nor to advance any thing upon common fame, which is always uncertain, but upon undoubted memoirs and faithful relations of ſuch perſons as have had a hand in affairs. He muſt always be upon his guard againſt the biaſs and affections of thoſe who ſupply him with matter, and muſt not credulouſly give his aſſent to the hiſtorians that went before him, without enquiring narrowly into their character, and what influence they may have been under when they wrote, in order to make a juſt eſtimate of their weight and credit.

An hiſtorian, as to his matter, ſhould chooſe ſubjects great in themſelves, and ſuch as are worthy of public fame and remembrance; and ſhould make himſelf ſo far maſter of his matter, as to be able to caſt it into what form he pleaſes, and to ſtrike upon all his ſubjects the colours they are naturally diſpoſed to bear, in order to make his leſſons profitable to poſterity, by regulating the heart and ſpirits of men, animating them to great and virtuous actions by illuſtrious examples, and cautioning them againſt vice, folly, cruelty, and injuſtice, by laying open the fatal conſequences reſulting from them. The courſe of his narration muſt proceed in the order of time in which the facts happened, in a pure, grave, uninterrupted ſeries, ſuch as may not improperly be compared to a great river flowing with compoſed majeſty and ſtately ſmoothneſs; and when it falls in his way to introduce little occurrences, they muſt be ſo artfully interwoven with the great, in the thread of the narration, as to offer a ſeaſonable entertainment and relief to the reader from the fatigue that too ſedulous an attention to the great, requireth. He muſt alſo obſerve great judgment in the ordinance and diſpoſition of events and their circumſtances, ſo as to intereſt the reader, and let him into all his thoughts and views, by making his perſons act as their character and temper inclined them; diſcovering their manners, ſentiments, deſigns, motives, and operations as they really ſtand in a neceſſary dependence upon each other, and with ſo natural a connection, as to ſhow nothing out of its place. His tranſitions, in which conſiſts the great art of narration, and one of its principal beauties, muſt be natural and eaſy, ariſing from the difference of ſubject rather than expreſſion. He muſt make a wiſe and judicious choice of circumſtances, ſuch as are proper to enlarge and improve the ideas of things, and to ſtrike that light and colour upon them which moſt eaſily attracts belief and engages the mind; and muſt for that purpoſe always obſerve a due mixture of great and little circumſtances, neither of which muſt be carried beyond nature, or be ſo minute, low, or frivolous, as to debaſe his ſubject. He muſt not only recite the bare events and actions of men, but alſo lay open the motives and principles from which they took their riſe, and upon which they proceeded to their final iſſues. He muſt lay open the hearts of the actors, let his reader into the moſt important ſecrets of their councils and deſigns, and oblige him with a ſight of thoſe ſecret ſprings which moved them to enterprizes, and of the cauſes of their ſucceſs or miſcarriage. He muſt be very ſparing and cautious in the uſe of deſcriptions, which are to be introduced ſo far only as they ſerve to illuſtrate things that are eſſential to the main ſubject, and to enliven the narration: and even in that caſe, they muſt be ſuccinct and elegant. The frequent uſe of harangues are diſapproved of by many judicious perſons; for theſe long formal harangues of generals to their ſoldiers, when in the preſence of the enemy, and ready to enter upon action, which we find in many hiſtorians, are undoubtedly not only unnatural and improbable, but contrary to the truth of hiſtory. Nevertheleſs, a ſhort ſpeech ſuited to the ſubject, made by a perſon of eminent character has its proper beauty and animates a narration. A judicious hiſtorian ought not to admit any portraits into his work but thoſe of the greateſt perſons, and ſuch as are principally intereſted, and have the chief hand in affairs; and theſe muſt be real, natural and truly reſembling their originals; expreſſive of their genius, the qualities of the head and heart, rather than deſcriptive of the external form of his perſonages. When ſuch are finiſhed with a maſterly hand, with true judgment and ſucceſs, they are not only great ornaments and embelliſhments in hiſtory, but of uſe to ſtrip the hearts of men of their diſguiſes, to lay open all their ſecret folds, and diſcloſe the real ſprings of actions. It is a great fault in an hiſtoriographer to abound too much in reflections of his own; he therefore muſt not turn philoſopher or moraliſt indifferently upon all occaſions; for every man deſires to be free in his judgment of the facts repreſented to him, and the conſequences he is to draw from them, in which conſiſts the greateſt pleaſure of the reader. But if an author ſhould throw in, or mingle reflections of his own with his ſtory, they muſt be ſuch as ariſe naturally from the ſubject, and contain a great and noble ſenſe in a few words; they muſt not be too fine ſpun or ſtudied, nor have more brightneſs than ſolidity, but appear rather to be the reaſoning of a wiſe ſtateſman, than the affectation of a declaimer; nor muſt they be too frequent, or too looſe and diſjointed, but be enamelled in the body of the work. Digreſſions, if made with judgment, and not too wide and foreign from the ſubject, have alſo their proper grace and ornament in hiſtory; as they give an agreeable variety to the narration, and relieve the mind of the reader; but they muſt be introduced by the hiſtorian with an artful hand and great addreſs; they muſt bear an alliance and connection with the purport of the hiſtory, and their length muſt be proportionably greater or leſs, as they are more nearly or remotely allied to the capital point of the ſtory.

HISTORY, a deſcription or recital of things as they are, or have been, in a continued, orderly narration of the principal facts and circumſtances thereof.

Hiſtory, with regard to its ſubject, is divided into the hiſtory of nature, and the hiſtory of actions. The hiſtory of nature (which is much the ſame with phyſiology) is a deſcription of natural bodies, whether terreſtrial, as animals, vegetables, foſſils, fire, water, air, meteors, *&c.* or celeſtial, as the ſtars, planets, comets, *&c.* Hiſtory of actions is a continued relation of a ſeries of memorable events.

Hiſtory with regard to its matter, is either natural, ſacred, civil, eccleſiaſtic, literary, or perſonal. Natural hiſtory, is a deſcription of the ſingularities of nature; its irregularities and prodigies; and the alterations it undergoes in the birth, progreſs, end, and uſe of things. Sacred hiſtory, is that which lays before us the myſteries and ceremonies of religion, viſions or appearances of the deity, miracles and other ſupernatural things, whereof God alone is the author. Civil hiſtory, is that of people, monarchies, ſtates, communities, cities, *&c.* Eccleſiaſtic hiſtory, is that which gives an account of the riſe and eſtabliſhment of the ſeveral religions and churches, of the riſe and progreſs of the various opinions ſects and hereſies, *&c.* Literary hiſtory treats of arts and ſciences, their original progreſs, and of the perſons who have been moſt remarkable in diſcovering and promoting them. Perſonal hiſtory, is that which gives the life of one or more ſingle perſons, and is the ſame with what is called biography.

Hiſtory with regard to its form, is either ſimple, figurate, or mixed. Simple hiſtory, is that which is delivered without art or ornament; being only a bare, and faithful recital of things, in the manner and order wherein they paſſed. Figurate hiſtory, is that which is further enriched with ornaments, by the wit and ingenuity of the hiſtorian; by laying open the characters of the principal perſons, the ſecret ſprings and motives of the ſeveral events, *&c.* Mixed hiſtory, is that which beſides the recital and ornaments of figurate hiſtory, calls in the proofs and authorities upon which the facts are founded; furniſhing authentic memoirs, or original letters, manifeſtos, *&c.* to vouch the truth of what is advanced. See HISTORIOGRAPHER.

Credibility, foundation, and nature of HISTORY. Some chooſe to define hiſtory, a true and well-grounded account of paſt events; a definition equally applicable to all the kinds of it: for tho' in ſome of them, as the hiſtory of nature and literature, we meet with accounts of qualities and opinions; of works of nature and art; yet theſe have no other relation to hiſtory than as they are events, and are deduced from obſervations on paſt changes. And as to the grounds on which the credibility of an hiſtory is founded, they are derived partly from the events related, and partly from the evidence and character of ſuch as relate them; whence ariſes an internal and external credibility.

The interior credibility conſiſts not only in the poſſibility of the event reported, but likewiſe in its probability; which laſt conſiſts in this, that the circumſtances in which an event is reported to have happened be conformable or ſuitable thereto, or that there be ſome foundation for it in the connection of the circumſtances, and that in parallel caſes the ſame had frequently happened. Hence it is eaſy to conceive, that many events may appear improbable, nay incredible to ſome, through mere ignorance, or by ſeparating them from their circumſtances. This is the caſe with the frequent charges of incredibility brought againſt thoſe numerous armies we read of in antient hiſtory, from confounding the regular armies of the moderns, with the tumultuous ones of the antients; which were a kind of militia compoſed of all or the greater part of the fighting men of a country.

Under the external grounds of credibility are comprehended the genuineneſs of the original teſtimony, and the capacity and integrity of thoſe who relate it: the evidence alledged muſt not only be aſcribed to its true authors, but theſe muſt appear to be perſons ſo circumſtanced and inclined as to relate the truth, ſo as to add to it nothing falſe, nor omit any thing of conſequence to the event reported. The firſt of theſe, or the genuineneſs of the original teſtimony, affects not only books and tracts, but public records and monuments of paſt events, ſtatues, inſcriptions, columns, edifices, *&c.* And to detect the fraudulent practices of former times, in forging evidences of this kind, requires great knowledge in the hiſtory not only of human ſocieties, but of the opinions, ſciences, languages, and cuſtoms of different times. And hence appears the neceſſity of great penetration, and capacity in an hiſtorian; but above all, of great integrity and ſincerity in relating the truth.

In trying the credibility of an event by the number of evidences brought in ſupport of it, we ought to weigh: 1. How many hiſtorians, and other known ſources, are really extant of any particular event. 2. The actual diverſity of their teſtimonies. 3. Their agreement and contradiction; and whether they cannot be reconciled. 4. The exterior and interior credibility of the contradicting narrations.

From what has been ſaid, we may draw the following inferences. 1. That there is a real and demonſtrable certainty of events, which ought not to be doubted or conteſted: and, indeed, ſcepticiſm in hiſtorical matters moſt commonly, if not always, proceeds from ignorance of the real nature of that certainty and its criterion, or from a conſciouſneſs of the indiſpenſible neceſſity of unwearied diligence, of farther helps, and deeper reflection in examining and proving, than the conveniency of many will allow. 2. That the demonſtrability of a fact, the credibility of an hiſtorian who reports, and the evidences of his whole work, ought never to be confounded or miſtaken for one and the ſame thing: for an hiſtorian may be well worth credit, tho' he be not infallible, and even though he has actually committed errors in ſome of his reports. 3. The demonſtrability of events has different degrees and limits, as reaching only ſo far as the records preſerved will permit: and hence appears the neceſſity of well diſtinguiſhing ſuch events, the reality or falſity of which can be proved, from events that are at beſt uncertain and doubtful. 4. That the credibility of events may gain new ſtrength is evident; ſince many facts cannot be known, till after the death of ſuch as were either the actors or perſons concerned in them: beſides it frequently happens, that records and vouchers of tranſactions, long ſince paſt, are afterwards diſcovered, which till then were either unknown, or could not be confidently publiſhed by thoſe who knew them, for want of ſuch witneſſes and proofs. 5. The credit of hiſtory can never decay by age, as ſome have erroneouſly aſſerted; ſince facts, once eſtabliſhed upon good evidence, muſt ever remain ſo, while the vouchers of ſuch evidence are preſerved: nay an account which formerly was uncertain, or even conſidered as improbable or falſe, may be vindicated and proved by late diſcoveries of hiſtorical writings and records.

Uſefulneſs of HISTORY. That great advantage may be reaped from the ſtudy of hiſtory, will appear from the following conſiderations. 1. It proves an agreeable amuſement, and relaxation: for though the mind is not wholly unactive in the ſtudy of hiſtory; yet, being a lighter and more entertaining employment, the faculties of the mind, when fatigued and almoſt exhauſted with more intenſe employment, find actual repoſe, and are recruited and reſtored to vigour. 2. But beſide the pleaſure of ſtudying hiſtory, it lays a foundation not only for general prudence, but for that particular kind, which the circumſtances and ſituation of each man require. To become acquainted with the characters of men, the marks, ſources, and effects of their paſſions and prejudices, the power and changes of their cuſtoms, and the like, is an eſſential and neceſſary ſtep to prudence: and all this knowlege is conſiderably improved by hiſtory, which teaches us to make other men's experience our own, to profit by it, and to learn wiſdom from their misfortunes. 3. Hiſtory is of eminent uſe in promoting virtue, partly by a copious and pleaſant inſtruction in a right and virtuous conduct in general, and partly by examples that inſenſibly lead us to the practice of ſeveral virtues in particular. 4. Every other ſcience receives great benefit from hiſtory. Philoſophy, and practical mathematics have recourſe to hiſtory, or to nature, through the medium of hiſtory, for moſt of their objects; and in many parts of theſe ſciences, the whole force of the demonſtration is founded on experiments; which would make but an indifferent figure, if the aſſiſtance of other men's experiments by the means of hiſtory were excluded: and the ſame holds of divinity, law, medicine, *&c.*

Method of ſtudying HISTORY. Perſons who read hiſtory merely for amuſement, or, having in view ſome particular branch of learning, attend only to certain branches of hiſtory, are not confined to that order and connection, which is abſolutely requiſite for obtaining a proper knowledge of hiſtory; the moſt regular, as well as ſucceſsful way of ſtudying which, is, to begin with an epitome of univerſal hiſtory, and afterwards apply to the hiſtory of particular nations and common-wealths: for the ſtudy of particular hiſtories preſuppoſes, or, to ſpeak more properly, is only extending the knowledge of particular parts of univerſal hiſtory. Unleſs this be our plan, we ſhall only fill the memory with ſome events; which may be done without applying to hiſtory, or pretending to the knowledge of it.

HISTORY, in painting, denotes a picture compoſed of divers figures, or perſons, repreſenting ſome tranſaction, either real or feigned. See PAINTING.

HISTRIO, in the antient drama, ſignified an actor or comedian, but more eſpecially a pantomime, who exhibited his part by geſtures and dancing. See the article DRAMA.

HISTRIX, the PORCUPINE, in zoology. See the article PORCUPINE.

HISTRIX, the PORCUPINE-FISH, in ichthyology, the rough ſpotted oſtracion, or globe-fiſh, beſet with frequent ſmall ſpines.

It grows to about twelve inches in length, and to eight or nine in diameter. It is brought to us dried from the eaſtern ſeas, and has been ſometimes caught in the Mediterranean. See plate CXXXII. fig. 5.

HITCH, in the ſea language, is to catch hold of any thing with a hook or rope, and by this means to hold it faſt: thus when a boat is to be hoiſted in, the ſailors ſay, hitch the tackles into the ring-bolts of the boat; and when they are about to weigh anchor, hitch the fiſh-hook to the fluke of the anchor.

HITCHEL, or HATCHEL. See the article HATCHEL.

HITCHING, a market-town in Hartfordſhire, fourteen miles north-weſt of Hartford, and thirty-two north-weſt of London.

HITHE, or HYTHE, in our old writers, denotes a port, wharf, or ſmall haven, to embark, or land wares at; as Queenhithe, *&c.*

HITHE is alſo one of the Cinque Ports in the county of Kent, ſituated on the engliſh channel, ſix miles weſt of Dover.

HIVE, *alveare*, in country affairs, a convenient receptacle for bees. See BEE.

There are ſeveral ſorts of hives uſed in different counties of England, as wicker-hives, made of privet; willow, or harl-hives, daubed with cow-dung tempered with duſt; or hives made with ſtraw bound with brambles. Some alſo, out of curioſity to ſee the bees work, have them made of wood with glaſs-windows, or ſides; but theſe are very cold, ſo that bees ſeldom thrive in them. The moſt uſual form of them is conical, or bell-faſhioned; and the beſt and warmeſt materials for making them are ſtraw and oſier, nicely twiſted and matted together. Of theſe there ſhould be kept ſeveral ſizes, ſo as to ſuit a bigger or leſſer ſwarm; and where you deſign to multiply your ſtock, make uſe of the ſmall ones, and of the larger where you deſire a great deal of honey. See HIVING, and HONEY.

HIVING *of Bees*, the placing a ſwarm of them in a hive, provided for that purpoſe. See the article HIVE.

When a ſwarm of bees has left an old hive, and is placed in the form of a cluſter hanging down from the branch of ſome tree or ſhrub, turn up the hive, and ſhaking the bough, make them fall into it, and then ſet the hive upon a cloth on the ground; or if the bough be ſmall, you may cut it off, and laying it on the cloth, ſet the hive over it: but if the bees are fixed on a branch near the ground, lay the cloth under it, then ſhake them down and place the hive over them. If it happen that ſome bees will obſtinately keep to the place where they at firſt fixed themſelves, after having tried in vain to ſweep them off gently with a bruſh, rub the branch with the juice of wormwood, rue, elder, or of ſuch other plants as they hate the ſmell of, and if this does not ſucceed, linen rags muſt be burnt under them, the ſmoak of which will ſoon drive them off, and make them join their companions. It ſometimes happens, that the ſwarm is not placed ſo favourably as in the inſtances before-mentioned; they often hang themſelves in long cluſters, on the ſmall branches of high trees, and in this caſe, many different expedients are to be uſed to hive them, according to the circumſtances of their poſition. The common method is for one man to climb the tree with a long ſtaff in his hand, and another to mount a ladder placed againſt the tree, and to hold the hive under the ſwarm, while the other ſweeps them into it with the ſtaff; and when the bough on which they hang is ſo far from the body of the tree, that this is impracticable by the ladder, the hive is to be fixed to the end of a long pole, and by that means held under the ſwarm while they are ſwept into it. When all this is impracticable, by reaſon of the great height of the branch on which the ſwarm hangs, a large cloth is to be ſpread on ſome of the lower branches, and the whole ſwarm ſwept down in a cluſter upon it; this is then to be thrown carefully to the ground, and another perſon is to be ready there to whelm the hive over the greater part of the cluſter, and the reſt will ſoon creep into it, and join them. If they are ſlow in doing this, they are to be driven in by burning linen rags about the places where they fly, the diſagreeable ſmell of which will ſend them towards the hive, where finding their companions not incommoded with it, they will naturally remain.

Sometimes the bees that go out in a ſwarm fix upon a hole in a wall, or a hollow in the trunk of a tree. This is a much better choice for them than the branch of a tree; but it is much worſe for the perſon who is to hive them, for they are very difficult to be got out. The common way is to attack theſe ſwarms in the middle of a cold night, to enlarge the opening from without, and placing the hive under it, to ſcoop the bees out with a ladle, and put them into the hive.

It ſometimes happens, that the ſwarms part, and light in ſight of one another; in which caſe, if the leſſer part are diſturbed, they will fly to the greater: but if they are not in ſight of each other, hive them both in two ſeveral hives, and ſhaking the bees out of one hive on the cloth on which the other hive ſtands, place that hive over them, and they will all take to it.

If your ſwarm happens after the middle of June, and are ſmall, put two or three of them together, even whether they ariſe the ſame day, or ſeveral days after; for by thus uniting them, they will labour the more carefully, gather ſtore of honey, and ſtoutly defend themſelves againſt all enemies. As to the manner of uniting them in one hive, it is thus performed: having ſpread a cloth on the ground, near the ſtool on which this united ſwarm is to ſtand, ſet a pair of reſts, or two ſupporters for the hive; then in the evening when it grows dark, knock down the hive out of which you intend to remove your bees upon the reſt; then lift up the hive a little, and clapping it between your hands to ſhake out the bees that ſtick in it, lay it down ſideways by thoſe inſects, and ſet the ſtock or ſwarm to which you would add them, upon the reſts over them; upon which they will immediately aſcend from the cloth underneath into the hive, and if any remains in the other hive, they will haſten after their companions. When you have gotten them all in, place the hive on the ſtool, which ſhould be done either that night, or early the next morning. Some reckon it better to place the hive in which the ſwarm is newly put, with a view to its being drove into another, with the ſkirts uppermoſt, and to ſet the other upon it, binding them about the ſkirts with a towel, and in this manner to let them ſtand till the morning, by which time all the bees will have aſcended, ſo that you may then ſet the receiver on a ſtool. Thus three or four ſwarms may be put together. But they ought to be united the ſame evening after they have ſwarmed; becauſe after having made combs, they are the more unwilling to part from them.

In theſe ſeveral methods of hiving bees, people ought to defend themſelves as carefully as poſſible againſt their ſtings; the ſecureſt way of doing which, is to have a piece of gauze, or coarſe muſlin, large enough to come over the perſon's hat, and to reach down to the collar of his coat behind, and to his breaſt before, which being kept at a little diſtance from his face by his hat, he may ſee what he does without the leaſt danger: he ought alſo to ſecure his hands by wearing a good pair of gloves; and woollen ones are the beſt for this purpoſe.

HOACHE, in natural hiſtory, a kind of earth approaching to the nature of chalk, but harder, and feeling like ſoap; whence ſome think that it is either the ſame with our ſoap-rock of Cornwal, or very like it. The Chineſe diſſolve it in water, till the liquor is of the conſiſtence of cream, and then varniſh their china-ware with it.

HOACTLI, in zoology, the name of an american bird deſcribed by Nieremberg: it is of the ſize of a common hen, the legs and neck are long; its head is black, and is ornamented with a beautiful creſt of the ſame colour; its whole body is of a fine white, but its tail is grey, as are alſo the upper ſides of its wings; the wings have a greeniſh caſt, and the back ſometimes has many black feathers; its feet are not webbed, its legs are of a pale whitiſh colour; it has a circle of white, beginning at the eyes, and going round the head: it is common on the lakes of Mexico, and builds among reeds and ſedge. It bites very deſperately.

HOAR-FROST. See FROST.

HOAR-HOUND, or **HOREHOUND**, *marrubium*, in botany. See MARRUBIUM.

HOARSENESS, *raucedo*, in medicine, a diminution of the voice, ſometimes attended with a preternatural aſperity, or roughneſs thereof.

The part here affected, is the aſpera arteria, and its larynx, which laſt chiefly forms the voice. See the articles ASPERA ARTERIA, and LARYNX.

The proximate cauſe is too great an effuſion of thin lymph upon the part. It is a catarrhal affection from a too ſharp ſalt, or acid lymph. Etmuller, in a very obſtinate hoarſeneſs, preſcribes ſpermaceti as an approved remedy; as alſo, decoct. raporum, and rob. paſſulorum.

In an inveterate hoarſeneſs, where a viſcid mucus, or thick lymph is the cauſe, diſſolving and expectorating medicines are convenient; and above all, ſyrup de eryſimo, oxymel ſillitic. and balſ. ſulph. Bleeding is to be avoided, for it prolongs the diſtemper.

Sometimes worms in the inteſtines are the cauſes of hoarſeneſs.

HOBBY, the name of a hawk, called by authors ſubbuteo.

It is a hawk of the lure, and not of the fiſt; and is very like the ſaker, only much leſs. It makes excellent ſport with net and ſpaniels; for when the birds ſee the hobby, they dare not commit themſelves to the wing, but lie cloſe to the ground, and ſo are taken in the nets.

HOCHSTET, a town of Swabia in Germany, ſituated twenty-five miles north-eaſt of Ulm.

HOD, an inſtrument uſed to carry bricks and mortar in, up ladders, *&c.* to build or repair houſes, *&c.* with.

HODMAN, an appellation given to a young ſtudent admitted into Chriſt's College in Oxford, from Weſtminſter-School.

HODNET, a market town of Shropſhire, ten miles north-eaſt of Shrewſbury.

HODSDON, a market-town of Hertfordſhire, ſeventeen miles due north of London.

HOE, in country affairs, a tool made like a cooper's addz, to cut upwards in gardens, fields, *&c.* This tool is commonly called the hand-hoe: for other ſorts of hoes ſee the next article.

This inſtrument is of great uſe, and ſhould be more employed in hacking and clearing the ſeveral corners, cracks and patches of land, in ſpare times of the year, which would be of no ſmall advantage thereto.

Prong Hoe. See the article Prong.

HOEING, according to Tull, is the breaking and dividing the ſoil by tillage, whilſt the corn, and other plants are growing thereon.

It differs from common tillage (which is always performed before the corn or plants are ſown or planted) in the time of performing it; and it is much more beneficial to the crops than any other tillage. This ſort of tillage is performed various ways, and by means of different inſtruments. See Plough.

Land, which before tilling would have yielded little, tho' the more it is tilled before ſowing, the greater plenty of crop it yields, yet if tilled only before the ſowing will always have ſome weeds, and they will partake of the advantage of the tillage as well as the corn. This is one reaſon for an after tillage, ſuch as that by hoeing. But there is another conſideration that yet more requires it, this is, that as ſoon as the ploughman has done his buſineſs by plowing and harrowing the land after ſowing, the ſoil of its own accord begins to undo it all again by tending towards its original texture and ſpecific gravity, the altering of which was the only buſineſs of all the former tillage. The breaking the particles of the earth, and making in it new pores and new ſuperficies, is the great buſineſs of the plough and harrow, but as ſoon as their uſe is over, the earth begins to coaleſce again to its own form, the particles unite together, and the artificial pores in a great meaſure cloſe up. The ſeed is nouriſhed in a worſe ground than it was at firſt put into, and the more the plant grows up and requires a larger ſupply of food, the worſe the paſture becomes: while nouriſhment is thus denied the growing plants, they are at the ſame time choaked with weeds, which being of a hardier nature than they, will grow with leſs ſupplies, and therefore thrive more vigorouſly and rob them of a great part of the little food the land before allowed them.

Tranſplanting is nearly allied to hoeing, but it is much inferior; the nature of this will not admit of its being a general thing, and even if it would, hoeing is better, for by tranſplanting, the plants can only be kept up to a certain period, after which they will not bear it; but hoeing may be uſed to them with advantage, to their utmoſt ſtanding, and makes them vigorous all the while. The roots of a plant are neceſſarily broken off in tranſplanting, and it requires ſome time for it to ſtrike a whole ſet of new ones, and if the earth about it is not kept thoroughly moiſtened all this time, the new formed roots will not be able to ſhoot, and the plant will ſtarve in the midſt of plenty; but on the contrary, in hoeing the ſame advantage of a new paſture for the plant is obtained by breaking the particles of earth, and at the ſame time no more of the roots are broken off than can eaſily be ſupplied, and the reſt remaining in their places, the plant continues growing without that ſtop and decay which muſt happen on tranſplanting, and which it recovers only by degrees.

One great benefit of hoeing, is, that it keeps plants moiſt in dry weather, the advantage of which to their growth is eaſily ſeen. This good office it performs on a double account; firſt as they are better nouriſhed by hoeing, they require leſs moiſture, and conſequently carry off leſs; for theſe plants, which receive the greateſt increaſe, having moſt terreſtrial nouriſhment, carry off the leaſt water in proportion to their augment, as is proved by Dr. Woodward's experiments. Secondly, the hoe, particularly the horſe-hoe, for the other does not go deep enough, procures moiſture for the roots from the dew that falls moſt in dry weather, and theſe dews ſeem to be the moſt enriching of all moiſture, as it contains in it a fine black earth, which will ſubſide from it in ſtanding, and which ſeems fine enough to be the proper pabulum or food for plants.

For a comparative view of the profits ariſing from the common and horſe-hoeing huſbandry. See Husbandry.

HOG, *ſus*, in zoology, a genus of quadrupeds, of the order of the jumenta, the characters of which are theſe: the upper fore-teeth are four in number, and are convergent; thoſe of the lower jaw are eight, and are patulous: the canine teeth of the upper jaw are two, and very ſhort; thoſe of the under jaw are ſingle, and exerted: the crown of the head is carinated, and the hoof is divided. See the article Swine.

Beſides the common hog, there are ſeveral other ſpecies, as, 1. The american hog, with the back briſtly behind, and with a naked tail. 2. The muſk hog, with a cyſt, or gland on the back; in which is ſecreted a perfumed fluid; its tail is naked. 3. The babyrouſſa, with two teeth growing on the forehead.

HOG's DUNG is, by Mortimer, reckoned one of the richeſt manures we are acquainted with, and the next in value to that of ſheep's dung, and is found to be equal in virtue to twice the quantity of any other dung, except this. The antients ſeem to have been diſpleaſed with it, on account of its breeding weeds, but this is only accuſing it of being too rich, for any dung will do this when laid too thick. It is an excellent manure for paſture-grounds, and excels all other kinds of dung for trees. The farmers who uſe this dung for their lands, generally take care to ſave it, by well paving the ſtyes, and encreaſe the quantity by throwing in bean-ſtalks, ſtubble, and many other things of a like nature; and by good management of this kind many farmers have procured fifty or ſixty loads of excellent manure a year, out of a ſmall ſtye. The very beſt way of uſing this dung, is to mix it with horſe-dung; and for this reaſon it is beſt to have the ſtye near the ſtable, that the two cleanſings may be mixed in one heap, and uſed together. They have in many parts of Staffordſhire a poor, light, ſhallow land, on which they ſow a kind of white-pea: the land is neither able to bear this, nor any thing elſe, to advantage for their reaping; but when the peas are ripe, they turn in as many hogs as the quantity of peaſe will fatten, ſuffering them to live at large, and remain there day and night; in conſequence of this the land will produce good crops of hay for ſeveral years afterwards; or if too poor for that, it will, at worſt, raiſe graſs enough to make it a good paſture-ground.

Hedge HOG, *erinaceus*, in zoology, a genus of quadrupeds, the lateral fore-teeth of which are ſhorter than the others; the noſtrils are criſtated; and the body, inſtead of hairs, is clothed, in the manner of that of the porcupine, with ſpines. See QUADRUPED and PORCUPINE.

Of this genus there are two ſpecies. 1. The erinaceous, with larger ears, or the common hedge-hog, being a little animal, conſiderably thick in proportion to its length, and which, when it draws itſelf together at the approach of danger, appears of an oval figure. The length of this creature is about ſeven inches; its head ſmall and oblong, broad towards the upper-part, and growing ſmaller towards the noſe; the mouth is formed very much like that of the badger; the eyes are ſmall, black, and protuberant; the ears are ſhort and broad; the neck is ſhort; the back broad and prominent; the legs ſhort and robuſt; the feet formed like thoſe of the dog; there are five toes on each, and one is ſhorter than the reſt, in manner of a thumb. The other ſpecies is the white erinaceous, with very ſmall ears, being larger than the common hedge-hog, but very like it in form.

Muſk HOG, *Tajacu*, in zoology. See the article TAJACU.

HOG-STEER, among ſportſmen, denotes a wild boar three years old.

HOG's FENNEL, a plant called by botaniſts peucedanum.

HOG's PLUM, a plant otherwiſe called ſpondias. See the article SPONDIAS.

HOG's WEED, a plant called by Linnæus boerhaavia.

HOGENHINE, in our antient ſaxon laws, ſignifies one that came as a gueſt to an inn, and continued there the third night, from which time he was accounted of that family; ſo that if he offended againſt the king's peace, his hoſt was to be anſwerable for him.

HOGSHEAD, in commerce, a meaſure of capacity, containing ſixty-three gallons. See the articles GALLON and MEASURE.

HOGUE, a town and cape on the north-weſt point of Normandy in France, near which admiral Rook burnt the french admiral's ſhip called the Riſing-ſun, with twelve more large men of war: weſt longitude 2°, and north latitude 49° 50′.

HOHIO, a river of North America, which riſing in the Apalachian mountains, near the confines of Carolina and Virginia, runs ſouth-weſt, and falls into the river Miſſiſſippi.

HOISE, or HOYSE, a term uſed by ſeamen, for hawling up any thing into the ſhip, or the getting up a top-maſt, yard, or the like.

HOITLALLOTL, in zoology, the name of an american bird, deſcribed by Nieremberg, and called by him *avis longa.* It is very remarkable for the ſwiftneſs of its running, and is of a very long ſhape, having alſo a long tail; its beak is alſo very long, black above, and grey underneath: its tail is green, and has all the ſplendor and beauty of the peacock's:

its whole body is of a whitiſh yellow, and, near the tail, of a blackiſh yellow; but the ſhoulders are black, with white ſpots. It does not fly high, nor very well, but runs ſo ſwiftly as is ſcarce to be conceived. It is but an ill taſted bird.

HOKE-DAY, the Tueſday after eaſter-week; which was the day on which the Engliſh conquered and expelled the Danes: this was therefore kept as a day of rejoicing, and a duty, called hoke-tueſday-money, was paid to the landlord, for giving his tenants and bondmen leave to celebrate it.

HOLCUS, INDIAN MILLET, in botany, a genus of the polygamia-monoecia claſs of plants, the corolla of which is a glume, furniſhed with a triple ariſta or awn; the ſtamina are three, the ſtyles two, and the ſeed ſingle.

HOLD, that part of a ſhip which lies between the keelſon and the lower-deck; in which, divided by bulk heads, are the ſteward's room, powder room, bread-room, and the boatſwain's and carpenter's ſtore-rooms. In a merchantman, all the goods and lading in general, are ſtowed in the hold.

HOLD-FAST, a large piece of iron, in the ſhape of the letter S, fixed into a wall, to ſtrengthen it. Alſo a tool uſed by joiners, carvers, &c. which goes through their benches, to hold faſt ſuch work as cannot be finiſhed by its being held in the hand.

HOLDE, in old law books, ſignifies the bailiff of a city or town: and according to ſome writers, it alſo ſignifies a general.

HOLDERNESS, a peninſula in the eaſt riding of Yorkſhire, which has the German ocean on the eaſt, and the river Humber on the ſouth.

HOLIBUT, a name ſometimes given to the turbot. See the article TURBOT.

HOLLAND, one of the United Provinces: it is about one hundred miles long, from north to ſouth, and ſcarce thirty miles broad; but enjoys the greateſt trade of any province in the world, and in point of ſtrength and riches is equal to the other ſix united provinces. It is ſituated one hundred miles eaſt of England, and is bounded on the north and weſt by the German ſea, on the eaſt by the Zuider-ſea, and on the ſouth by the provinces of Zealand and Utrecht.

HOLLAND is alſo the name of the ſouth-eaſt diviſion of Lincolnſhire.

HOLLAND, in commerce, a fine and cloſe kind of linen, ſo called from its being firſt manufactured in Holland. See the article LINEN.

HOLLOW, in architecture, a concave moulding, about a quarter of a circle, called by ſome a caſement, and by others, an abacus.

HOLLOW-SQUARE, in the military art, a body of foot drawn up, with an empty ſpace in the middle for colours, drums, and baggage.

HOLLOW-TOWER, according to Harris, is a rounding made of the remainder of two briſures, to join the curtin to the orillon, where the ſmall ſhot are played, that they may not be ſo much expoſed to the view of the enemy.

HOLLY, *aquifolium*, in botany, is ranked by Linnæus among the ilices. See the article ILEX.

Holly-hedges make an excellent fence; but are liable to periſh in ſevere winters. See the article HEDGE.

The timber of holly is the whiteſt of all hard wood, and therefore uſed by inlayers. It is alſo uſed by mill-wrights, turners, &c.

Knee-**HOLLY**, a name given to butcher's broom.

Sea **HOLLY**, a plant more uſually called eryngium. See the article ERYNGIUM.

HOLM ſignifies an iſland in a river: alſo a hill or cliff.

HOLM is alſo a port and market-town of Cumberland, ſituated on Solway-frith, twenty miles weſt of Carliſle.

HOLOCAUST, a burnt offering, or ſacrifice, wholly conſumed by fire: of this kind was the daily ſacrifice in the jewiſh church. This was done by way of acknowledgment, that the perſon offering and all that belonged to him, were the effects of the divine bounty. The heathens, who alſo offered holocauſts, probably conſidered them in the ſame light: and the diſpoſing of ſacrifices this way was the general cuſtom, till Prometheus introduced the cuſtom of burning only a part, and retaining the remainder for his own table.

HOLOGRAPH, among civilians, a will wholly wrote by the hand of the teſtator.

HOLOMETER, a mathematical inſtrument that ſerves univerſally for taking all meaſures, both on the earth and in the heavens.

HOLOSTEUM, in botany, a genus of the pentandria-trigynia claſs of plants, the corolla whereof is compoſed of five plane, patent, tridentated petals, broadeſt towards the ends; the fruit is a cylindrico-conic capſule; the receptacle is free, obſoletely triquetrous, and has very ſhort hairs; the ſeeds are numerous and triquetrous. There is a ſpecies of this genus, in which the ſtamina are only four inſtead of five.

HOLSOM, in the ſea-language, is ſaid of a ſhip that will ride well, without rolling or labouring.

HOLSTEIN, a dutchy of Germany, in the circle of Lower Saxony, one hundred miles long, and fifty broad. It is bounded by Sleſwic or South Jutland on the north, by the Baltic ſea and the dutchy of Sax-Lawenburg on the eaſt, by the river Elbe on the ſouth, and by the German ſea on the weſt.

HOLY-GHOST, one of the perſons of the holy Trinity. See GOD and TRINITY.

Order of the HOLY-GHOST, the principal military order in France, inſtituted by Henry III. in 1569. It conſiſts of an hundred knights, who are to make proof of their nobility for three deſcents. The king is the grand-maſter, or ſovereign, and as ſuch, takes an oath on his coronation day, to maintain the dignity of the order.

The knights wear a golden croſs, hung about their necks by a blue ſilk ribbond, or collar. But before they receive the order of the Holy Ghoſt, that of St. Michael is conferred as a neceſſary degree; and for this reaſon their arms are ſurrounded with a double collar.

HOLY-THURSDAY, the ſame with aſcenſion-day. See ASCENSION.

HOLY-DAYS, the ſame with feſtivals. See the article FEAST.

HOLY-ROOD DAY, a feſtival otherwiſe called the exaltation of the croſs. See the article CROSS.

HOLY-HEAD, a cape and town in the iſle of Angleſea, ſituated in the iriſh channel: weſt longitude 4° 45′, and north latitude 53° 26′.

HOLY-ISLAND, an iſland in the German ſea, ſix miles ſouth of Berwick upon Tweed: weſt long. 1° 42′, and north lat. 55° 45′.

HOLY-WELL, a town of North Wales, in Flintſhire, ten miles eaſt of St. Aſaph.

HOLYNESS denotes purity, or a perſon free from ſin.

HOLYNESS is alſo a title given to the pope, by thoſe of his communion.

HOMAGE, in law, is the ſubmiſſion, loyalty, and ſervice which a tenant promiſed to his lord, when he was firſt admitted to the land which he held of the lord in fee: alſo that owing to a king, or to any ſuperior.

In the antient grants of lands and tenements in fee, the lord not only obliged his tenants to perform certain ſervices, but likewiſe took a ſubmiſſion, with promiſe or oath that they ſhould be true to him as their lord and benefactor.

The lord of the fee of lands, for which homage is due, takes it of every tenant as he comes to the land; but none can either do, or receive homage, except ſuch perſons as have eſtates in fee ſimple or tail, in their own right, or the right of another.

HOMAGE AUNCESTREL, is where a perſon and his anceſtors, time out of mind, held land of the lord and his anceſtors by homage. Such lord was to acquit his tenant againſt all other lords above him, and from all other ſervice.

HOMAGE-JURY, a jury in a court-baron, conſiſting of tenants that do homage to the lord of the fee.

This jury makes enquiry into, and preſentments of defaults and deaths of tenants, and of admittances and ſurrenders into the lord's court.

HOMAGER, a perſon bound to do homage to another.

HOMAGIO RESPECTUANDO, a writ, by which the eſcheator was commanded to deliver lands to the heir of the king's tenant, notwithſtanding his homage was not done.

HOMAGIUM REDDERE has been uſed to ſignify, to renounce homage; as where the tenant or vaſſal made a ſolemn declaration of diſowning his lord, for which there was a form preſcribed by the feudatory laws.

HOMBERG, a town of Germany, in the circle of the Upper Rhine, and landgraviate of Heſſe, ſituated ten miles north of Francfort: eaſt long. 8° 24′, north lat. 50° 20′.

HOMBERG is alſo a town of Germany, in the palatinate of the Rhine, and dukedom of Deuxponts: eaſt long. 7° 6′, and north lat. 49° 20′.

HOMER, OMER, CORUS, or CHOMER, in jewiſh antiquities, a meaſure containing ten baths, or ſeventy-five gallons, and five pints, as a meaſure for things liquid; and thirty-two pecks and one pint, as a meaſure for things dry. The homer was moſt commonly a meaſure for things dry, and the greateſt that was uſed among the Jews: it contained, according to the Rabbins, ten ephaps, or thirty ſata or ſeahs. Corus is the moſt uſual term in the hiſtorical writers, and homer, omer, or chomer, among the prophets.

HOMICIDE, the ſlaying or killing a perſon. This is divided into two ſorts, voluntary and caſual: voluntary, is that which is done with deliberation, and a full purpoſe to kill; and, when done out of malice prepenſed, is murder: caſual homicide, is where the death of a perſon happens by chance, or without any intention to kill; which is man-ſlaughter, or chance-medley.

HOMILY, in eccleſiaſtical writers, a ſermon, or diſcourſe, upon ſome point of religion, delivered in a plain manner, ſo as to be eaſily underſtood by the common people.

At the time of the reformation there were ſeveral of theſe homilies made and printed, and ordered to be read in ſuch churches as were not provided with a ſufficiently learned miniſter, in order to prevent unſound doctrine being taught in remote country places.

In the primitive church, homily rather meant a conference or converſation by way of queſtion and anſwer, which made part of the office of a biſhop, till the Vth century, when the learned prieſts were allowed to preach, catechize, *&c.* in the ſame manner as the biſhops uſed to do.

There are ſtill extant ſeveral fine homilies, compoſed by the antient fathers, particularly St. Chryſoſtom and St. Gregory.

HOMINE ELIGENDO, *&c.* in law, is writ directed to a corporation, for the election of a new perſon to keep one part of the ſeal, appointed for ſtatutes-merchant, when a former party is dead.

HOMINE REPLEGIANDO, in law, is an antient writ that lies for bailing a perſon out of priſon, where any one is confined without commandment of the king or his judges; or for any cauſe that is repleviable. This writ is directed to the ſheriff, commanding him to replevy the priſoner.

In caſe a perſon takes away ſecretly, or keeps in his cuſtody any perſon againſt his will, on oath made thereof, and a petition to the lord-chancellor, he will grant a writ of replegiari facias, upon which the ſheriff returns an elongatus, and then there iſſues a capias in withernam, to take the party ſo offending.

HOMINE CAPTO IN WITHERNAM, in law, is a writ for apprehending a perſon who has taken any other man or woman, and conveyed him or her out of the county, ſo that they cannot be replevied by law.

HOMOCENTRIC, the ſame with concentric. See the article CONCENTRIC.

HOMOCHROA, in natural hiſtory, a genus of foſſils, conſiſting of ſtones compoſed of a cryſtalline matter, conſiderably debaſed by earth, and this of various kinds in the different ſpecies; but ever of one kind only in the ſame ſtone, which is thence always of one plain and ſimple colour, and never ſubject to veins or other variegations.

Of this genus authors reckon five ſpecies. 1. The white homochroum, from half an inch in diameter, to ſeven or eight inches. 2. The red homochroum, from one inch or leſs in diameter, to two or three. 3. The yellow homochroum of various ſizes, from one inch or leſs in diameter, to ſix or ſeven. 4. The bluiſh homochroum, whoſe general ſize is two inches in diameter. And 5. The greeniſh homochroum, from half an inch to two inches in diameter.

All theſe ſpecies are of an orbicular form a compact and a cloſe texture, and freely give fire with ſteel.

HOMODROMUS VECTIS, that kind of lever, in which the weight is in the middle, between the power and the fulcrum; or the power in the middle between the weight and the fulcrum.

HOMOGENEOUS, or HOMOGENEAL, an appellation given to things, the parts of which are ſimilar or of the ſame nature and properties.

HOMOGENEOUS LIGHT, that whoſe rays are all of one colour and degree of refrangibility, without any mixture of others. See the article COLOUR.

HOMOGENEOUS SURDS, thoſe which have the ſame radical character, or ſigns, as $\sqrt[2]{a}$, and $\sqrt[2]{b}$. See the article SURD.

HOMOGENEUM COMPARATIONIS, in algebra, is uſed by Vieta, for the abſolute number in quadratic, cubic, *&c.* equations; which number always poſſeſſes one ſide of the equation, and is the product of the roots multiplied into one another. See the article EQUATION.

HOMOLOGOUS, in geometry, an appellation given to the correſponding ſides and angles of ſimilar figures, as being proportional to each other.

Thus, in two ſimilar triangles A B C, DEF, (plate CXXXIII. fig. 1.) the ſides

AB and DE, BC and EF, and AC and DF are homologous. And theſe triangles are to each other as the ſquares of their homologous ſides. See the article TRIANGLE.

HOMOLOGOUS THINGS, in logic, thoſe which agree in name, but are of different natures.

HOMONYMOUS, an appellation given to words which have two different ſignifications, being the ſame with equivocal terms.

HOMSOKEN, a privilege enjoyed by every perſon, in his own houſe or home, which ought not to be invaded. See the article HAMSOKEN.

HONAN, a province of China, bounded by thoſe of Xanſi and Pekin, on the north, by Xantong and Nankin on the eaſt, by Suchuen on the ſouth, and by Xenſi on the weſt; lying between 33° and 37° north latitude. Its capital is Caifum.

HONDURAS, a province of Mexico, in North America; which, including the country of the Moſkito-indians, is ſituated between 85° and 94° weſt long. and between 12° and 16° north latitude.

HONE, a fine kind of whetſtone, uſed for ſetting razors, pen knives, and the like. See the article COS.

Hones pay, on importation, a duty of 9 s. 6$\frac{20}{100}$d. per hundred, and draw back 8 s. 7$\frac{1}{2}$ d.

HONEY, *mel*, is, in general, a thick, viſcous, and more or leſs fluid ſubſtance, of a whitiſh or yellowiſh colour, ſweet to the taſte, ſoluble in water, becoming vinous in fermentation, inflammable, liquable by a gentle heat, and of a fragrant ſmell.

There are three diſtinctions of honey, according to its purity, fluidity, and the manner in which it has been procured from the honey-combs. The firſt and fineſt kind is virgin-honey, or the firſt produce of a ſwarm, obtained from the combs without preſſing; theſe being only ſet to drain, in order to its running out. The ſecond kind is that known by the name of white-honey, being thicker than the former, and often indeed almoſt ſolid: it is procured by preſſing the combs, but without the aſſiſtance of heat. The third and worſt kind is the common yellow honey, obtained from the combs firſt heated over the fire, and then preſſed.

Honey is prepared in the nectaria, or honey-glands of plants, ſituated in their flowers; the only office of the bees is to collect the ſmall quantities lodged there, and to amaſs them in ſtores capable of furniſhing themſelves with food, and us with a ſupply ſufficient for our purpoſes. The bee that is out in ſearch of honey, no ſooner ſees a flower that it likes, than it ſettles on it, and ſeizing on theſe glands, it ſucks from them all the ſweet juice they contain, which is either abſolute honey, or very eaſily changed into ſuch. The honey thus taken into the body of the bee, and depoſited again into the cells of the honey-comb, is deſtined not only for the food of the young offſpring, while unable to go out and help themſelves, but for the ſuſtenance of the bees themſelves in bad weather, or when there is no food for them abroad.

Notwithſtanding, however, that honey is known to be originally lodged in the flowers of plants, and might ſeem to be always ready in ſufficient quantities for the bee; yet it is neceſſary that ſeveral circumſtances concur, in order to its being fine and perfect in its kind. Among theſe are, a warm and ſerene ſtate of the air, during the time in which the bees are moſt of all employed in making it, and a good ſtate of health in the bee, as alſo its being made at a time when many fragrant plants are in flower, and in a place where ſuch grow not too far off.

Honey taken out of the new combs early in the ſummer, is vaſtly preferable to that taken from the ſame hive in autumn. The reaſon of this is, that the bees, during the time of their making the former, have been in a more healthy and vigorous ſtate, and that there have been fragrant flowers in greater number and perfection at that ſeaſon, than later in ſummer.

Honey is an excellent pectoral, and is detergent, aperient, and diuretic. It ſhould always be clarified, by melting it over the fire, either alone, or with the whites of eggs, taking off the ſcum, before it is uſed in medicine. The chemiſts pretend to have made an acid ſpirit from it, which is a ſolvent for gold; but we have only their aſſurance of it, no body elſe having ever ſeen ſuch a liquor.

Honey, imported, pays 7 s. 8$\frac{40}{100}$d. the barrel, and draws back 6 s. 9 d. Or each ton, imported, pays 2 l. 6 s. 2$\frac{40}{100}$d. and draws back 2 l. 0 s. 6 d.

HONEY-COMB, a waxen ſtructure, full of cells, framed by the bees, to depoſit their honey and eggs in. See BEE and WAX.

The conſtruction of the honey-comb ſeems one of the moſt ſurpriſing parts of the works of inſects, and the materials of which it is compoſed, which, though evidently collected from the flowers of plants, yet do not, that we know of, exiſt in them in that form, has given great cauſe of ſpeculation to the curious. The regular ſtructure of the comb is alſo equally wonderful. When the ſeveral cells in it are examined, it ſhould ſeem that the niceſt rules of geometry had been conſulted for its compoſition, and all the advantages that could be wiſhed, or deſired, in a thing of that kind, are evidently found in it. Each cell conſiſts of ſix plane ſides, which are all trapeziums, but equal to each other: the bottom of the cell is contrived with three rhombuſes H K D I, D E F I, and F G H I (plate CXXXIII. fig. 3. n° 1.) ſo diſpoſed as to conſtitute a ſolid angle at I, under the three equal angles D I H, D I F, and H I F, each of which is double the maximum angle of $54° 44' = DIK = DKI$. Hence it comes to paſs, that a leſs quantity of ſurface is ſufficient to contain a given quantity of honey, than if the bottom had been flat, in the proportion of 4658 to 5550, as has been found by calculation; that is, nearly a fifth of the whole, ſo far as the figure in the end of the cells extends, in each; which fifth part of wax and labour ſaved, amounts to a vaſt deal in the whole comb. And if theſe admirable inſects knew their advantage, they could not more nicely obſerve the rules of modern geometry. Hence we may obſerve, that though the rules of diſcovering the maxima and minima of quantities by fluxions, is a part of knowledge which the mathematicians have but lately acquired, and which they eſteem the ſublimity of human ſcience, yet this very thing was imparted to theſe inſects at the creation. See the article ALVEOLUS.

The method of making two ſorts of cells in each comb, is alſo admirably contrived to ſave the expence of wax, ſince had they been made ſingle, every comb muſt have had its peculiar baſe, and every ſet of cells their bottom of wax, whereas one bottom now ſerves for two cells; and there is but one plate of wax in the center of a double comb.

This ſtructure occaſions a very great ſparring of the wax, or matter of the comb: but beſides this there is another great advantage reſulting from this ſtructure, which is, that the angles ariſing from the forementioned combination of the baſes, greatly ſtrengthen the whole work.

The ſides of the cells are all much thinner than the fineſt paper, and yet they are ſo ſtrengthened by their diſpoſition, that they are able to reſiſt all the motions of the bee within them, as they are frequently obliged to be. The effect of their thruſting their bodies into the cells, would be the burſting of thoſe cells at the top, were not this well guarded againſt. But to prevent this, the creatures extend a cord, or roll of wax, round the verge of every cell, in ſuch a manner that it is ſcarce poſſible they ſhould ſplit in that particular part. This cord or roll is at leaſt three times as thick as the ſides of the cell, and is even much thicker and ſtronger at the angles of the cells, than elſe where, ſo that the aperture of each cell is not regularly hexagonal, though its inner cavity be perfectly ſo. See fig. *ibid.* n° 2.

The ſeveral combs are all placed parallel to one another (*ibid.* n° 3.) and there is ſuch a ſpace left between them, that the bees can eaſily paſs: and often they place a part of the comb in a contrary direction to the reſt, ſo that while the others are placed horizontally, theſe ſtand perpendicularly. The cells which have ſerved, or are to ſerve for the habitation of the worms of the common, and of the male bees, are often made alſo at other times the receptacles of honey; but tho' theſe are indifferently made to ſerve either uſe, there are others deſtined only to receive honey.

The celerity with which a ſwarm of bees received into a hive, where they find themſelves lodged to their minds, bring their works of the combs to perfection, is amazing. There are vaſt numbers at work all at once; and that they may not incommode one another, they do not work upon the firſt comb till it is finiſhed, but when the foundation of that is laid, they go to work upon another, ſo that there are often the beginnings of three or four ſtories made at once, and ſo many ſwarms allotted to the carrying on the work of each. It wou'd be a deſirable thing to ſee the bees at work, in making theſe elegant and regular fabrics; but it is ſcarce poſſible to ſee any thing of this kind diſtinctly, even with the advantage of glaſs-hives; for, as Mr. Reaumur obſerves, no bee ever works ſingly upon this occaſion, but wherever the fabric is erecting, there are numbers together trying to aſſiſt each other, and their motions are ſo ſwift, and ſo hid by their ſtanding before one another,

other, that very little is to be ſeen of them. New bees are every moment going to the place, and old ones going away; and very frequently thoſe which arrive late are diſpatched away immediately after they arrive: there are only ſome very ſhort moments in which the glaſs of the hives can give a view of the creatures regularly employed at their work; for the moment one ſees a bee at work in building, that moment we ſee one either fly off, or elſe another get before her, ſo as to hinder the view: however, it is plain that the bee uſes her teeth, in modelling and faſhioning the wax.

HONEY-COMB, in gunnery, is a flaw in the metal of a piece of ordnance, when it is ill caſt and ſpongious.

HONFALIZE, or the HOFATIZE, a town of the auſtrian Netherlands, in the province of Luxemburg: eaſt long. 5° 45′, and north lat. 50° 15′.

HONFLEUR, a port-town of France, in the province of Normandy, ſituated on the ſouth ſide of the river Seyne, near the Engliſh channel: eaſt longitude 15′, and north latitude 49° 24′.

HONITON, a borough-town of Devonſhire, twelve miles eaſt of Exeter.

It ſends two members to parliament.

HONOUR, a teſtimony of eſteem or ſubmiſſion, expreſſed by words, actions, and an exterior behaviour by which we make known the veneration and reſpect we entertain for any one, on account of his dignity or merit. The word honour is alſo uſed in general for the eſteem due to virtue, glory, and reputation. It is alſo uſed for virtue and probity themſelves, and for an exactneſs in performing whatever we have promiſed; and in this laſt ſenſe we uſe the term, *a man of honour*. But honour is more particularly applied to two different kinds of virtue, bravery in men, and chaſtity in women. Virtue and honour were deified among the antient Greeks and Romans, and had a joint temple conſecrated to them at Rome: but afterwards each of them had ſeparate temples, which were ſo placed, that no one could enter the temple of Honour, without paſſing through that of Virtue; by which the Romans were continually put in mind, that virtue is the only direct path to true glory. Plutarch tells us, that the Romans, contrary to their uſual cuſtom, ſacrificed to Honour uncovered; perhaps to denote, that wherever honour is, it wants no covering, but ſhews itſelf openly to the world.

HONOUR, is alſo uſed for a ſignory or lordſhip, on which inferior lordſhips and manors depend; for as a manor conſiſts of ſeveral lands, tenements, ſervices, and cuſtoms, ſo an honour contains ſeveral manors, knight-fees, *&c.*

HONOURS *of the church*, are the rights and privileges belonging to the patron, *&c.* as a ſeat and ſepulchre in the chancel, the being firſt ſerved with the conſecrated bread and wine, *&c.*

HONOURS *of the city*, are the public offices and employments thereof: thus he who had been conſtable, overſeer of the poor, and churchwarden of his pariſh, common-council-man, alderman, and laſtly mayor, has paſſed all the honours of the city. See the article CITY.

HONOUR-COURTS, are courts held within the honours of ſeigniories.

Funeral-HONOURS are the ceremonies performed at the interment of the great, as hangings, hearſes, funeral harangues, *&c.* See the article FUNERAL.

Maids of HONOUR, are ſix young ladies in the houſhold of the queen, and princeſs royal; the ſalary of thoſe of a queen are 300 l. *per ann.* each, and thoſe of the princeſs dowager of Wales, 200 l.

HONOUR-POINT, in heraldry, is that next above the center of the eſcutcheon, dividing the upper part into two equal portions. See the article POINT.

HONOURS *and ruff*, a well-known game at cards, wherein all the duces are kept in the pack; by which means, as four play (two being of a ſide), twelve is dealt to each perſon, and there remain four for the ſtock, whereof the uppermoſt is turned up for trump; he that hath the ace of that ſuit, ruffs, that is, he takes in thoſe four cards, and lays out four others in their place. The honours are the ace, king, queen, and knave; and he that hath three of theſe honours in his own hand, his partner not having the fourth, ſets up eight by cards, that is two tricks; if he hath all four, then ſixteen or four tricks; and here obſerve, that it is all one, if the two partners make three or four honours between them, as if one had them. If the honours are equally divided among the players, they then ſay, *honours are ſplit*. If either ſide are at eight groats, any of the partners has the benefit of calling *can you?* provided he has two honours in his hand; and if his partner anſwers *one*, the game is up, which is nine in all: if he has more than two, he ſhews them directly, which anſwers the ſame purpoſe. However, if a trick be played before any of the gameſters call, they loſe the benefit of *can you*, for that deal.

As to the value of the cards, the ace is the higheſt, then the king, queen, knave, ten, nine, *&c.* in order: but the leaſt trump will win the higheſt card of any other ſuit.

In playing, vigilance and judgment do a great deal; for though you have but low cards, yet by playing them ſuitable to thoſe in your partner's hand, ſo that he may either trump them, or play the beſt of that ſuit on the board, you may contribute much to gain the game. For this purpoſe, you ought to have a ſpecial eye to what cards are played out, by which means you will know what to play, if you lead, or trump ſecurely and advantageouſly.

HONOURARY, ſomething done or conferred upon any one, to do him honour. See the article HONOUR.

Honourary is ſometimes underſtood of a perſon who bears or poſſeſſes ſome poſt or title, only for the name's ſake, without doing any thing of the functions belonging to it, or receiving any advantage from it: thus we ſay, honourary counſellors, honourary fellow, *&c.*

Honourary is alſo uſed for a lawyer's fee; or a ſalary given to public profeſſors in any art or ſcience.

HONOURARY SERVICES, in law, ſuch ſervices as relate to the tenure of grand ſerjeantry, and uſually annexed to honours.

HONOURARY TUTOR, a perſon of quality, appointed to have an eye over the adminiſtration of the affairs of a minor, while the onerary tutors have the real management of them.

HOOD, in falconry, a piece of leather, with which the head of a hawk, falcon, *&c.* is covered.

After a hawk is ſeeled, ſhe ſhould be fitted with a large eaſy hood, which is to be taken off and put on very often, watching her two nights, and handling her frequently about the head: when you perceive that ſhe has no averſion to the hood, unſeel her in an evening by candle-light, continuing to handle, hood, and unhood her as before, till at laſt ſhe takes no offence, but will patiently endure handling: after unſeeling, anoint with your finger and ſpittle, the place where the ſeeling-thread was drawn through; then hood her, and hold her on your fiſt all night: as ſoon as ſhe is well reclaimed, let her ſit upon a perch, but every night keep her three or four hours on the fiſt; ſtroking, hooding, and unhooding her. This may alſo be done in the day-time, as ſoon as ſhe has learned to feed eagerly, and without fear.

HOOF, *ungula*, the horny ſubſtance that covers the feet of divers animals, as oxen, horſes, ſheep, *&c.* See HORN.

A horſe's hoof ſhould be of a round, not longiſh figure; and its ſubſtance ſolid, tough, high, ſmooth, without any circles, ſomewhat ſhining, and of a dark colour, for that which is white is commonly brittle; in ſhort, it ought to be of the colour of the hoof of a deer, and the whole foot round, but a little larger below than above, upright, and ſomewhat hollow on the inſide, and ſo diſpoſed that he may tread more on the toe than the heel.

The hoof of a horſe is either perfect or imperfect: an imperfect hoof is one that wants any of the above qualities; and, 1. May be broad and ſpreading out at the ſides and quarters; ſuch a horſe has, for the moſt part, narrow heels, and will ſoon be flat-hoofed; he will neither carry a ſhoe long, nor travel far. 2. Others are rugged or brittle-hoofed, which is a ſign that it is too hot and dry. Some are long, which cauſes the horſe to tread all upon his heels, and by that means to breed wind-galls. 4. There are ſome crooked hoofs, broad on the outſides and narrow within, by which means the horſe is ſplay-footed. 5. Others have flat hoofs, and not hollow within, which give riſe to the inconveniencies above ſpecified in the firſt ſort of imperfect hoofs: but if it be too hollow, it will dry too faſt, and make him hoof-bound. 6. When the fruſh is broad, the heels will be weak and ſoft, and the horſe will never tread boldly on the ground. 7. Some have narrow heels; theſe are the tendereſt of all, and the horſe will grow hoof-bound.

Bony **HOOF**, is a round bony ſwelling, growing on the very top of a horſe's hoof, which is always cauſed by ſome blow or bruiſe.

The method of cure is, firſt to digeſt the ſwelling, either with rotten litter, or hay boiled in ſtale urine, or with a plaſter of ſtale wine-lees and wheat-flour boiled together, in order to ripen it, and bring it to ſuppuration, or to diſſolve the tumour. If it come to a head, lance it in the loweſt part of the ſoftneſs, with a thin hot iron, to let out the matter; then tent it with turpentine, deer's ſuet, and wax, equal quantities of which ſhould be boiled together; and laying a plaſter of the ſame ſalve over it, to keep in the tent till it be thoroughly well.

HOOF *bound*, this diſorder is a ſhrinking of the hoof at the top and at the heel, which makes the ſkin ſtare above the hoof, and grow over it.

This diſorder may happen to a horſe, either by keeping him too dry in the ſtable, by ſtreight ſhoeing, or by ſome unnatural heat after foundering.

HOOF-BRITTLE, an infirmity in horſes, proceeding either naturally, from the ſire or dam; or accidentally, from a ſurfeit falling down into the feet; or from the horſe's being formerly foundered.

For the cure, take unwrought wax, turpentine, ſheep's ſuet, and hog's greaſe, of each four ounces; ſallad-oil, a quarter of a pint; and of dog's greaſe, half a pound: boil them all together, and, with this mixture, anoint the hoof well for two or three days, eſpecially at the ſetting on of the hair, and ſtop them with cow-dung and dog's greaſe, melted together.

HOOF-SWELLED, a diſorder that ſometimes happens by a prick, or a young horſe's being over-ridden, or too hard wrought, and which, if not ſpeedily removed, will beget a wet ſpavin.

For the cure, take the ſtrongeſt aqua fortis you can get, and firſt file or draw away the old hoof ſomewhat near, with a file or drawing-iron, then touch what is left of the hoof, three or four dreſſings or more, with the aqua fortis; and anoint the foot with an ointment made of one pound of hog's greaſe; patch-greaſe, three quarter's of a pound; venice-turpentine, five ounces; new wax, three ounces; and ſallad oil, three ounces; all melted together over the fire: and by anointing the coffin of the foot quite up to the top, you will cauſe a new hoof to grow upon it.

HOOF LOOSENED, a dividing of the horn or coffin of the hoof from the fleſh, at the ſetting on of the coronet.

This diſorder cannot be properly cured without the aſſiſtance of the farrier.

HOOGSTRATEN, a town of the auſtrian Netherlands in the province of Brabant, 20 miles north-eaſt of Antwerp: eaſt long. 4° 45′, north lat. 51° 25′.

HOOK, a piece of iron or braſs-wire bent, and turned up at one end.

Hooks are a neceſſary ſort of utenſils, and being uſed for various purpoſes, are of ſeveral ſorts: thus, boat-hooks (ſee pl. CXXXV. fig. 1. n° 1.) are for ſetting off boats; can-hooks (*ibid.* n° 2.) are for hoiſting caſks into a ſhip: cant-hooks (n° 3.) are for turning or canting large maſts, having at one end a ring for a hand-ſpike to go through, and at the other a claw; laying-hooks (n° 4.) uſed by rope-makers, when laying of cordage; rave-hooks (n° 5.) uſed by caulkers for picking the old oakam out of the ſeams of ſhips; ſheer-hooks (n° 6.) let into or put on the main and fore-yard-arms of fire-ſhips, in order to faſten into an enemy's ſhrouds, ſails, or rigging. Beſides theſe there are draught-hooks, placed both behind and before the cheeks of a gun-carriage; fiſh-hooks of ſeveral ſizes, uſed for catching fiſh; and a large ſort in the ſame form, and called by the ſame name, uſed in ſhips for taking hold of the ſhank of the anchor, when it is to be hove up to the bow; gamming-hooks, uſed when gammoning the bowſprit; port-hooks, drove into the ſides of a ſhip, to hang the ports upon; puttock-hooks, for the plates to hook upon; tackle-hooks, ſpliced into the ſtraps of blocks, or ends of rope; pot-hooks, to hang kettles or pots over the fire; ſpinning hooks, uſed by rope-makers to hang their threads on, as they ſpin them; armour-hooks to lay arms upon, as guns, halberts, half-pikes, *&c.* chimney-hooks, to ſet the tongs, fire-ſhovel, *&c.* againſt; caſement-hooks, curtain-hooks, hooks for doors, gates, *&c.* double line-hooks, ſingle line-hooks, tenter-hooks, *&c.*

HOOK-PINS, are bolts made with a ſhoulder at one end, and uſed by carpenters in framing: theſe are drove through the mortices and tenants of the work, prepared for building or wharfing, *ibid.* n° 7.

HOOKER, in naval architecture, a veſſel much uſed by the Dutch, built like a pink, but rigged and maſted like a hoy. Hookers will lie nearer a wind than veſſels with croſs-ſails can do. They are from fifty to two hundred tons burden, and with a few hands will ſail to the Eaſt-Indies.

HOOPOE, *upupa*, in ornithology. See the article UPUPA.

HOP, *lupulus*, *humulus*, in botany, a genus of the dioecia-pentandria claſs of plants, neither the male nor female flower of which has any corolla; the cup of the male flower is compoſed of five leaves;

that of the female is made up of only a ſingle leaf, very large, and of an oval figure; the ſeed is ſingle, roundiſh, covered with a coat, and contained within the cup.

Mortimer reckons four kinds of hops: 1. The wild garlic-hop. 2. The long and ſquare hop. 3. The long white. And, 4. the oval hop. The firſt of theſe is not worth cultivating. The ſecond is a good hop, but looking generally red towards the ſtalk, it will not fetch ſo good a price at the market. The long white hop is the moſt beautiful of all, and produces the greateſt quantity: this kind and the oval will grow very well together. They delight in a deep rich garden-mould; this may have ſand among it, but never ſhould have any clay: moory black land is what they are planted in, in Eſſex, but any light land will do. The hop ſends its roots four or five yards deep, and for this reaſon it thrives beſt in that land where there is a good bottom below what is uſually ſtirred, or manured, for agriculture. If the hop-land be wet, it muſt be laid up in high ridges, and drained in winter, that the roots be not rotted or chilled.

New land is found to ſucceed better with hops than old, and on this principle they are very cautious in their plantations in Kent, and look forward for the after-produce. When they make a new hop-ground, they plant it with apple-trees at a large diſtance aſunder, and with cherry-trees between; by this means when the hops have grown ten years, which they judge as much as they will do well, they place their account in the cherry-trees, which bear large crops; theſe they gather for about thirty years, and then they cut them up, and depend upon their apple-trees only, which they find very large and ſtrong by that time.

The dry ſtalks of hops ſhould be burnt on the ground in winter, covering them with a little freſh earth as they burn. This makes together an excellent compoſt, to make the hills of. The land muſt be dug or plowed well, and laid very even, and then the places for the hills marked out by a line, and a ſtick put in every place where one is to be. A thouſand hills may be made in an acre of ground, and ſix or ſeven plants ſet on every hill. From ſix to nine feet ſhould be allowed between every hill, and the grounds in the hills ſhould be better and richer than the common earth. Some plant hops in March and April, but the moſt experienced people prefer the month of October, becauſe they will then ſtrike firm roots, and be ſtrong and vigorous againſt ſpring. The largeſt plants are to be choſen; and it is beſt to procure them from ſome rich ground, where the hills have been laid high; they ſhould be about eight or ten inches long, and have three or four joints or buds a piece; the holes for planting them are to be dug eight or ten inches deep, and about a foot over, and in each of theſe holes four plants are to be ſet, one in each corner: they may be covered an inch deep over the top, if planted in October; but in ſpring, when they have ſhot from the joints, then they muſt not be buried: after this, the ground muſt be carefully kept clear of weeds.

Dreſſing of HOPS. This is preparing the ground in winter and ſpring for the making a good ſummer-crop. In doing this, the hills upon which the plants ſtand muſt be all pulled down, and undermined on every ſide, till the ſpade comes near the principal root; then ſhake off or remove with the hand the looſe mould from the upper or looſe roots, that you may ſee where the new roots grow out of the old ſets. The old ſets are to be carefully preſerved, but the other roots may be cut away. Whatever time the hills are pulled down, the roots muſt not be cut till March. When the young hops are dreſſed for the firſt time, all the roots are to be cut away that grew the year before, and the ſets are to be cut off within one inch of the ſame; and every year after, they muſt be cut as cloſe as may be to the old roots; but to a weak hop, ſome of the ſhoots are to be left at the dreſſing. Thoſe roots of the plant which grow downwards, are never to be injured, but only thoſe which run horizontally are to be cut. The old roots and the young ones may be eaſily diſtinguiſhed, in that the old ones are always red, and the young white. If there are by accident any wild hops got among the reſt, the places where they grow are to be marked with ſticks, or otherwiſe, at the time of their being gathered; and after this, at the time of dreſſing the ground, that whole hill is to be deſtroyed, and a new one made with new plants in the room of it. When the roots are cut and dreſſed, the rich compoſt is to be put to them; and the hills muſt not be made too high at firſt, leſt they hinder the young ſhoots.

Gathering and drying of HOPS. Hops blow in the latter end of July; in the beginning of Auguſt they bell, and they are ſometimes ripe at the beginning of September, ſometimes later. When they begin to change colour, are eaſily pulled to pieces, and their ſeeds look brown within them, they are ripe, and they are then to be gathered as quick as poſſible, for the leaſt blaſt of wind will hurt them at this time.

The manner of gathering hops, is to take down four hills ſtanding together in the midſt of the garden, and to cut the roots even with the ground, then lay the ground level, and when it is ſwept clean, it makes a floor, on which the hops may be laid and picked. The hop-plants are firſt unwound from the poles, and then the people ſit round and pick off the hops into baſkets.

Care ſhould be taken to dry the hops as faſt as they are picked, for in lying undried they are apt to heat and change colour very quickly. If the quantity picked be ſo large that the kiln, in which they are to be dried, is over ſtocked, they muſt be ſpread thin upon a floor, and they will keep two or three days in that manner, without any harm. Indeed, where the quantity is but ſmall, there is no need to have recourſe to the kiln at all, for they will dry much better than any other way, by being laid thin upon a floor, and often turned. The drying of hops is the moſt material part of their manufacture; for if they be ill dried, they looſe all their agreeable flavour; and great caution ſhould be uſed, that they be all equally dried.

Bagging of HOPS, a term uſed by the farmers, who cultivate hops, for the laſt thing they have to do with them, in order to bring them to market; that is, the putting them up in large bags of coarſe cloth, for carriage. When the hops have been picked and dried in the ooſt, or tin-floor, they are ſo brittle that they would break to pieces and be ſpoiled if they were immediately to be put up; they are therefore to lie together three weeks, or thereabouts, that they may become tough: if they are covered from the air by blankets in the heap, they may be bagged much ſooner than if left open.

The manner of bagging them is this: a hole is made in an upper floor, ſo large that a man may eaſily go up and down it; then a hoop is fitted to the mouth of the bag, and ſo firmly ſewed on, that it cannot be torn off; the bag is then let down thro' the hole, and the hoop remaining above, ſtops it from being pulled quite thro', being larger than the hole: a few hops are to be firſt thrown into the bag, and a perſon below is to take up a parcel of theſe in each corner of the bag, tying it with a packthread, this makes a ſort of taſſel, by which the bags are afterwards the eaſier managed and turned about. When this is done, one man muſt go down into the bag, and, while another caſts in the hops, he muſt tread them down equally every way with his feet; when the bag is in this manner filled, it is to be ripped from the hoop, and ſewed up, leaving two taſſels at the corners, as at the bottom. A bag of hops thus prepared, may be kept for ſeveral years in a dry place.

The tops of this plant, being of a cooling quality, are eaten, when boiled, as an emollient. A decoction of hop-flowers is alſo accounted an antidote againſt poiſon, and cures the itch, as well as the ſyrup thereof, and is eſteemed excellent in choleric and peſtilential fevers. The heads and tendrils are good in the ſcurvy and moſt cutaneous diſeaſes. Juleps and apozems are alſo prepared with hops for hypochondriacal and hyſterical affections, and to promote the menſes: but the chief uſe of this plant conſiſts in preſerving beer and other malt liquors (in which the flower of this plant is a principal ingredient) from turning ſour, and rendering it wholeſome and grateful to the taſte, *&c.*

Hops, the hundred weight, pay, on importation, 5 l. 4 s. 6 d. and on exportation draw back 3 l. 9 s. 4½ d. but if exported to Ireland, there is no drawback.

HOPE, or *Cape of Good*-HOPE. See the article GOOD-HOPE.

HOPLITES, in antiquity, an appellation given to ſuch of the candidates at the olympic games, as ran races in armour.

HOPPER, a kind of baſket, wherein the ſeed-corn is carried at the time of ſowing. See the article SOWING.

It is alſo uſed for the wooden trough, in a mill, into which the corn is put to be ground. See the article MILL.

HORARY, ſomething relating to an hour. Hence

HORARY, or HOUR-CIRCLE *of a globe*, is a ſmall brazen circle, fixed upon the brazen meridian, divided into twenty-four hours, having an index moveable round the axis of the globe, which, upon turning the globe fifteen degrees, will ſhew what places have the ſun an hour before or after us: for inſtance, if the index of the hour-circle be ſet at the upper XII. when the globe is rectified for London, and the globe turned 15 degrees from eaſt to weſt, the index will point at the hour of I. which ſhews that all places under that meridian, and particularly Naples, have the ſun an hour ſooner than London has it: on the contrary, let the index be ſet at the upper XII. again, and the globe be turned 15 degrees from weſt to eaſt, the index will point at XI. becauſe all places under that meridian, particularly the Madeira-iſlands, have the ſun an hour after London has it. For the ſeveral problems performable on the globes, by means of the horary circle, ſee the article GLOBE.

HORARY CIRCLES, or **LINES**, in dialling, are the lines or circles which mark the hours on ſun-dials. See DIAL.

HORARY MOTION *of the earth*, the arch it deſcribes in the ſpace of an hour, which is nearly 15 degrees, though not accurately ſo, as the earth moves with different velocities, according to its greater or leſſer diſtance from the ſun. See EARTH.

HORD, in geography, is uſed for a company of wandering people, which have no ſettled habitation, but ſtroll about, dwelling in waggons, or under tents, to be ready to ſhift as ſoon as the herbage, fruit, and the preſent province is eaten bare: ſuch are ſeveral tribes of the Tartars, particularly thoſe who inhabit beyond the Wolga, in the kingdom of Aſtracan and Bulgaria.

A hord conſiſts of fifty or ſixty tents, ranged in a circle, leaving an open place in the middle. The inhabitants of each hord uſually form a military company or troop, the eldeſt whereof is commonly the captain, and depends on the general or prince of the whole nation.

HORDEOLUM, or **CRITHE**, in medicine, a tubercle in the upper part of the eye-lid near the eye-brows, like a grain of barley, whence it takes its name; but it is commonly called a ſtye. For the cure of an hordeolum, Allen orders it to be covered over with white wax, or anointed with hen's greaſe, or faſting ſpittle; or to rub it with the body of a fly, the head being thrown away; or with the blood of a dove or partridge. If all theſe prove ineffectual, it muſt be extirpated by cutting, or conſumed by a liquid cauſtic; after which, let the plaſter of the abbot de Grace be applied.

HORDEUM, **BARLEY**, in botany, a genus of the triandria-trigynia claſs of plants, the corolla whereof conſiſts of two valves; the inferior valve is angular, of an ovato-acuminated figure, bellied, and longer than the cup, and terminates in a very long ariſta; the anterior valve is lanceolated, plane and ſmaller; the corolla ſerves as a pericarpium, ſurrounding the ſeed, and not letting it out; the ſeed is oblong, ventricoſe, pointed at each end, and marked with a longitudinal furrow.

For the culture and great uſe of this plant, ſee the article BARLEY.

For the bounty on the exportation of barley, ſee CORN.

HORDICALIA, or **HORDICIDIA**, in antiquity, a religious feaſt held among the Romans, wherein they ſacrificed cattle big with young. This feaſt fell on April 15, on which day they ſacrificed thirty cows with calf, to the goddeſs Tellus, or the Earth: part of them were ſacrificed in the temple of Jupiter. The calves taken out of their bellies were burnt to aſhes at firſt by the pontifices, afterwards by the eldeſt of the veſtal virgins.

HOREHOUND, *marrubium*, in botany. See the article MARRUBIUM.

Baſe **HOREHOUND**, a name given by ſome to ſtachys. See the article STACHYS.

Water-**HOREHOUND**, *lycopus*, in botany. See the article LYCOPUS.

HORIZON, in aſtronomy and geography, that great circle which divides the heavens and the earth into two equal parts, or hemiſpheres, diſtinguiſhing the upper from the lower. See SPHERE.

The horizon is either ſenſible or rational. The ſenſible horizon is that circle, which, being diſcovered by our ſenſes, limits our proſpect. See the article CIRCLE.

When we are on terra firma, this circle commonly ſeems rugged and irregular, occaſioned by the unevenneſs of the ground: but at ſea, there are no ſuch irregularities. The ſemi-diameter of this circle, varieth according to the height of the eye of the obſerver. If a man ſix feet high ſtood upon a large plain, or the ſurface of the ſea, he could not ſee above three miles round.

The rational or true horizon, is a great circle of the apparent celeſtial ſphere, dividing it into two equal hemiſpheres, and ſerving as the limits of elevation or depreſſion of celeſtial objects. This horizon being parallel to the ſenſible horizon, is diſtant from it by the ſemi-diameter of the earth, through whoſe center it paſſes: for the aſtronomers reduce the appearances of the heavens to a ſpherical ſurface, which is not concentrical to the eye, but to the earth.

It divides the heaven and earth into two parts, the one light, and the other dark, which are greater or leſſer, according to the condition of the place, &c. It determines the riſing and ſetting of the ſun, moon, or ſtars, in any particular latitude; for when any of theſe appear juſt at the eaſtern part of the horizon, we ſay, it riſes; and when it does ſo at the weſtern part, we ſay, it ſets. And from hence alſo the altitude of the ſun or ſtars is accounted, which is their height above the horizon.

This circle is divided by aſtronomers into four quadrants, or cardinal points. See the article COMPASS.

The poles of this horizon are the zenith and the nadir: and the innumerable circles drawn through theſe poles to the horizon, are called the vertical circles, or azimuths. See the articles ZENITH, NADIR, and AZIMUTH.

Theſe two horizons produced to the fixed ſtars, will appear to coincide into one, ſince the earth, compared to the ſphere in which the fixed ſtars appear, is but a point; therefore the two circles, which are but a point diſtant from each other, may be well conſidered as coinciding into one.

HORIZON *of a globe.* See the article GLOBE.

HORIZONTAL, ſomething relating to the horizon; or that is taken in, or on a level with the horizon: thus we ſay, an horizontal plane, &c.

HORIZONTAL DIAL, that drawn on a plane parallel to the horizon, having its ſtyle elevated according to the altitude of the pole, in the place it is deſigned for. See the article DIAL.

HORIZONTAL DISTANCE. See the article DISTANCE.

HORIZONTAL LINE, in perſpective, a right line drawn through the principal point parallel to the horizon; or it is the interſection of the horizontal and perſpective planes. See the article PERSPECTIVE.

HORIZONTAL PARALLAX. See the article PARALLAX.

HORIZONTAL PLANE, that which is parallel to the horizon of the place, or nothing inclined thereto.

The buſineſs of levelling is to find whether two points be in the horizontal plane, or how much the deviation is.

HORIZONTAL PLANE, in perſpective, a plane parallel to the horizon paſſing thro' the eye, and cutting the perſpective plane at right angles.

HORIZONTAL PROJECTION. See the articles PROJECTION and MAP.

HORIZONTAL RANGE, or LEVEL RANGE, *of a piece of ordnance*, is the line a ball deſcribes, when directed parallel to the horizon, or horizontal line.

The horizontal ranges are the ſhorteſt: ſome pieces of cannon will make them ſix hundred paces, and ſome but one hundred and fifty; and the ball with the range of ſix hundred paces, will go from nine to thirteen feet in the earth. See the article GUNNERY.

HORIZONTAL REFRACTION. See the article REFRACTION.

HORIZONTAL SHELTERS, among gardeners, are defences diſpoſed parallel to the horizon, for tender plants, bloſſoms, and fruits, in the ſpring, to defend them againſt blaſts and pinching nights.

Horizontal ſhelters, ſays Miller, have by ſome perſons been greatly recommended to preſerve fruit-trees, but with how little reaſon, or upon what ſlight experiments, every one that has ever made uſe of them will eaſily judge, eſpecially thoſe which are contrived by placing tiles in the walls, at certain diſtances; nothing being more obvious than that vegetables, when prevented from receiving the advantages of dews, rains, &c. theſe kindly benefits of heaven, grow weak, languid, and at laſt entirely decay: and from numbers of experiments, which have been lately made, we find that trees imbibe great quantities of nouriſhment through the pores of their leaves and branches, whereby they are rendered vigorous and healthy, even in ſuch ſeaſons, and upon ſuch ſoils, where one would think it impoſſible they ſhould receive much nouriſhment from the earth: to deprive them of this advantage, therefore, is no leſs than deſtroying them.

The only ſort of ſhelter Mr. Miller approves of, for fruit-trees, is that made with two leaves of ſlit-deal, joined over each other, and painted; theſe being fixed upon the top of the wall, with pullies, to draw up and down at pleaſure, form

a

Fig: 1. HOMOLOGOUS.

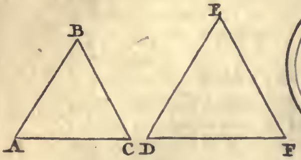


Fig: 2. HOROPTER.

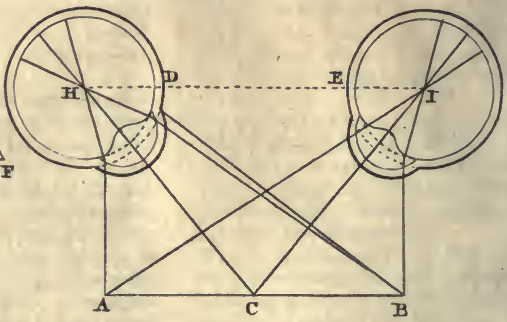


Fig: 3. HONEY-COMB.

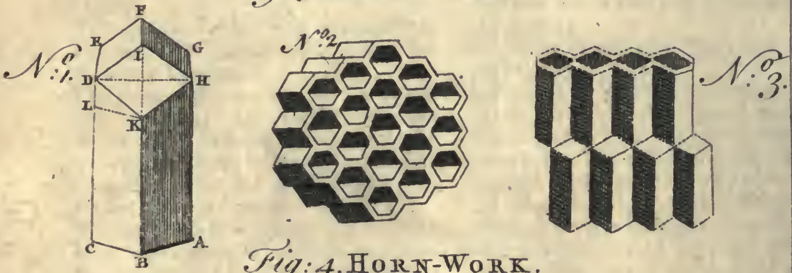
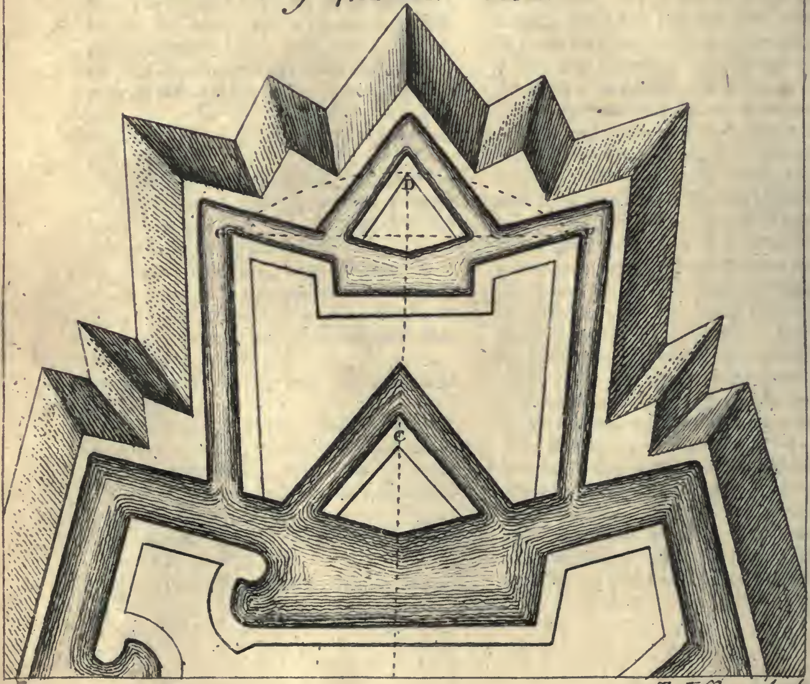


Fig: 4. HORN-WORK.



T. Jefferys Sculp.

a ſort of penthouſe, which are let down in great rains, or cold nights, during the time that the trees are in flower, or the fruit is ſetting. But then, he obſerves, that theſe ſhelters ſhould be removed away ſoon after the fruit is ſet, ſo that the trees may enjoy all the advantages of rain, dew, *&c.* in the ſummer, which are abſolutely neceſſary to have healthy trees, or good fruit.

HORMINUM, CLARY, in botany, a genus of the didynamia-gymnoſpermia claſs of plants, reckoned by ſome a ſpecies of baum; the flower of which is monopetalous and ringent; the upper lip is hollow, and ſemibifid: the ſeeds are four in number, and contained in the cup. See plate CXXXV. fig. 2.

An infuſion or decoction of clary, is eſteemed good in the fluor albus, colic, flatulencies of all kinds, and hyſteric complaints.

This plant is alſo ſaid to be an antiſpaſmodic, good againſt epilepſies, and in great eſteem as a provocative to venery. It has alſo been commended as a vulnerary, and its juice is an ingredient in ſome ointments and plaſters.

Horminum is a name alſo uſed for a ſpecies of ſage. See the article Sage.

HORN, *cornu*, in phyſiology, a hard ſubſtance growing on the heads of divers animals, particularly the cloven-footed quadrupeds; and ſerving them both as weapons of offence and defence.

The caſting of the horns of deer is a ſingular phænomenon, the true reaſon of which ſeems to be a ſtoppage of the circulation; ſo that being deprived of the nouriſhing juice, they fall off much in the ſame manner as the leaves of trees do in autumn. About ten days after the horns are caſt, the new ones begin to appear: theſe at firſt are ſoft and hairy, but they afterwards grow hard, and the creature rubs off the hair.

Horns make an article of commerce. Thoſe of oxen or cows, imported, pay a duty of 1 s. $7\frac{15}{100}$d. per hundred, and draw back on exportation, 1 s. $5\frac{25}{100}$d. Thoſe of harts or ſtags, pay on importation 5 s. $9\frac{75}{100}$d. per hundred, and draw back 5 s. $1\frac{20}{100}$d.

Horn is alſo a muſical inſtrument of the wind-kind, chiefly uſed in hunting, to animate the hunters and the dogs, and to call the latter together.

The french horn is bent into a circle, and goes two or three times round, growing gradually bigger and wider towards the end, which in ſome horns is nine or ten inches over.

Horn, in architecture, ſometimes denotes a volute. See the article Volute.

To give a ſtroke with the **Horn**, among farriers, is to bleed a horſe in the roof of the mouth with the tip of a ſtag's horn.

Horn *of plenty.* See Cornucopia.

Horns *of inſects*, the ſlender oblong bodies projected from the heads of thoſe animals, and otherwiſe called antennæ, or feelers.

The horns of inſects are extremely various; ſome being forked, others plumoſe or feathered, cylindrical, tapering, articulated, *&c.*

As to the uſe of theſe parts, ſome have imagined they ſerved to wipe and defend the eyes; others, that they ſerved as feelers, leſt the creature ſhould run againſt any thing that might hurt it; and others there are, who think them the organs of ſmelling.

Horn-beam, *carpinus*, in botany. See the article Carpinus.

Horn-coot, a name ſometimes given to the great horn owl. See Bubo.

Horn-fish, a ſpecies of acus, otherwiſe called gar-fiſh. See the article Acus.

Horn work, in fortification, an out-work compoſed of two demi-baſtions, joined by a curtin. See plate CXXXIII. fig. 4. Its conſtruction is very ſimple. From C the angle of the half-moon, they lay off eighty-eight fathoms to D; and on the center C, with the radius C D, deſcribe the arch F D G, on which laying off D F D G each equal ſixty fathoms, and drawing F G, this will be the exterior ſide of a polygon, whereon the two demi-baſtions may be deſcribed in the uſual way. The parapet of the horn-work is the ſame with that of the half-moon, and its moat is $\frac{3}{4}$ of the great moat. Its curtin is uſually defended by an half-moon, whoſe moat is $\frac{3}{4}$ of that of the great half-moon, before the curtin of the place.

According to Vauban, none of the out-works is equal in ſtrength to the horn-work, if placed before the baſtion, and not as uſual before the curtin.

Horn-geld, a tax paid for feeding of horned beaſts in the foreſt. See Forest.

HORNET, *crabro*, in zoology, a ſpecies of apis with a black thorax, and double black ſpots on the ſegments of the body. See the article Apis.

Hornet-fly, a two-winged fly, ſo called from its reſemblance to the hornet.

HORNSEY, a market-town of the eaſt

riding of Yorkſhire, 35 miles eaſt of York.

HOROGRAPHY, the ſame with dialling. See the article DIALLING.

HOROLOGIUM, a general name for inſtruments to meaſure the hours, as a watch, clock, dial, &c. See the articles WATCH, CLOCK, &c.

HOROPTER, in optics, a right line A B (plate CXXXIII. fig. 2.) drawn through the point C, where the two optic axes, H C and I C, meet, parallel to the line H I which joins the centers of the two eyes, H and I.

It is called horopter, as limiting the bounds of diſtinct viſion. See VISION.

HOROSCOPE, in aſtrology, is the degree of the aſcendant, or the ſtar that riſes above the horizon at a certain moment, which is obſerved in order to predict ſome future event, as the ſucceſs of a deſign, the fortune of a perſon who was at that inſtant born, &c.

The ſame name is alſo given to a ſcheme or figure containing the twelve houſes, in which are marked the ſituation of the heavens and ſtars, in order to form predictions. See HOUSE.

Lunar **HOROSCOPE**, the point from whence the moon proceeds when the ſun is in the aſcending point of the eaſt.

HORSE, *equus*, in zoology, a well known quadruped, of the order of the Jumenta, the characters of which are theſe: the fore-teeth are ſix in number, the upper ones incurvated, and the inferior prominent: the canine teeth are not exerted, and are on each ſide ſeparated by a ſpace from the teeth: the hoof is undivided, and the teats are two, and placed in the groin.

The horſe is one of the nobleſt quadrupeds we are acquainted with. In ſtrength and natural fierceneſs, he is inferior to few, and yet eaſily tamed. The head is long, and large; the eyes large, and prominent; the ears erect, and beautiful; the neck is long and thick, and elegantly decorated with a mane; the body is rounded, and beautifully turned; the legs are ſtrong, without being bulky; and the tail is long, and hairy all the way; the hairs being like thoſe of the mane, only longer, thicker, and more beautiful.

Foreign horſes or mares on their being landed in this kingdom, pay a duty of 1 l. 18 s. 6 d. and on their exportation, a draw-back is allowed of 1 l. 13 s. 9 d. But britiſh horſes, mares, and geldings, on their exportation, pay only 5 s. each.

Stone-**HORSE**, or STALLION. See the article STALLION.

Maſter of the **HORSE**. See MASTER.

Hunting-**HORSE**, ought to have a large, lean and long head, open ears, ſmall, and ſtanding upright; a forehead long, broad, and riſing in the middle, like that of a hare; his eyes ſhould be full, large, and bright; his noſtrils wide and red within; his mouth large, deep in the wikes, and hairy; his thropple or wind-pipe large, looſe, and ſtraight when he is reined in with the bridle; his head ſhould be ſet on his neck in ſuch a manner, that a ſpace may be felt between his neck and his choul; his creſt ſhould be firm, thin, and well raiſed; his neck long and ſtraight, yet not looſe and pliant; his breaſt ſtrong and broad; his cheſt deep; his chine ſhort; his body large; his ribs round like a barrel, his belly being hid within them; his fillets large; his buttocks rather oval than broad; his cambrels upright, and not bending; his legs clean, flat and ſtraight; his joints ſhort, well knit, and upright, eſpecially betwixt the paſterns and the hoof, and with but little hair on his fetlocks; his hoofs black, ſtrong, and hollow, and rather long and narrow, than big and flat; and his mane and tail long, and rather thin than thick.

As to marks or colours, ſome do not ſcruple to affirm, that wherever a horſe is met with that has no white about him, eſpecially in his forehead, tho' he be otherwiſe of the beſt reputed colours, as bay, black, ſorrel, he is of a dogged diſpoſition, eſpecially if he has a ſmall pink eye, a narrow face, and a noſe bending like a hawk's bill.

HORSE-RACING, a diverſion more uſed in England than in all the world beſide. Horſes for this uſe ſhould be as light as poſſible, large, long, and well ſhaped, nervous, of great mettle, and good wind, with ſmall legs, and neat ſmall ſhaped feet.

The rider ought to place himſelf on the horſe with his knees firm, and his ſtirrups juſt at ſuch a length, that when his feet are thruſt home in them, he can raiſe himſelf a little in his ſaddle; for without that allowance, his legs will not be firm when he comes to run; the counterpoiſe of his body muſt be forward, to facilitate the horſe's running, and his elbows cloſe to his body; he muſt not ſway to this ſide or that, but muſt take great care of his ſeat and hand; he ſhould alſo take care not to hold himſelf by the bridle, and not to twitch it back upon any occaſion.

A plate being to be run for, every man that rides muſt be the juſt weight both at ſtarting and at the end of the ſame heat: for if any one wants weight at coming in, he loſes the heat, even tho' he came in firſt horſe. Half an hour is allowed between every heat to rub down the horſes, and at the warning of the drum and trumpet, the jockeys are to mount. If the ſame horſe wins two heats running, or two heats out of three, he wins the plate; but if three heats are won by three different horſes, a fourth is run, when he that wins two of the heats gains the plate. In theſe races, where there are more heats than one, it is ſometimes a piece of policy in a rider to loſe a heat, and for the eaſe of the horſe to lie behind all the way, as much as he can, provided he brings him in within the diſtance-poſt: but when there is only a ſingle heat to be run, he muſt puſh for all at that one time.

Horſe-races are to be begun and ended the ſame day, and no plate, except the king's plates, ſhall be run for, that is under 50 l. value, on the penalty of 200 l. It is alſo ordained, that only one horſe ſhall be entered by one perſon for the ſame plate, and if any perſon enters more, all the others will be forfeited. 13 Geo. II. c. 19.

Backing a Horse, the breaking him to the ſaddle, or the bringing him to endure a rider.

When this is done, which ſhould be on ſome light plowed grounds, care muſt be taken that all the tackling be good and firm, and every thing in its due and proper place; then a perſon is to hold his head, and another to mount him; but this muſt not be done ſuddenly, or at a jerk, but very gradually and ſlowly, by ſeveral half riſings and heavings. If he bears this patiently, the perſon is to ſeat himſelf firmly on his back; but if he be troubleſome, and not tamed enough, the perſon is to forbear the attempt to mount, and he is to be trotted hard in the hand over the ſaid plowed lands again, till he is willing to receive the rider quietly on his back. When this is done, the perſon who is on his back muſt cheriſh him, and the man who has his head muſt lead him a few paces forward; then he is to be cheriſhed again. The feet are to be fitted well in the ſtirrups, and the toes turned out; afterwards the rider is to ſhrink and move himſelf in the ſaddle, and the perſon who holds his head, is to withdraw his hand a little farther from the mouth. As the rider moves his toes forward, the holder muſt move him forward with the rein, till he is made to apprehend the rider's motion of body and foot, which muſt always go together, and with ſpirit, and will go forward without the other's aſſiſtance, and ſtay upon the reſtraint of the rider's hands.

When this is accompliſhed, let him be cheriſhed, and have graſs and bread to eat; and then let the rider mount and alight ſeveral times, cheriſhing him between each time; and thus he is to be managed till he will go on, or ſtand ſtill at pleaſure. This being done, the long rein may be laid aſide, and the band about the neck, which are always uſed on this occaſion, and nothing will be neceſſary but the trenches and caveſon, with the martingal. A groom muſt lead the way before; or another horſe going only ſtraight forwards, and making him ſtand ſtill when deſired. In this manner, by ſometimes following, and ſometimes going before another horſe on the trot, the creature will by degrees be brought to know that it is his buſineſs to be quiet and governable.

Horse-shoes, plates of iron uſed for the defence of horſes-feet. Theſe are of ſeveral ſorts.

1. That called the planch-ſhoe, or pancelet. This ſhoe is exceeding good for a weak foot, as it keeps it from ſtones and gravel, and will laſt longer than any ſhoe: but it is ſaid to make a good foot and bad leg, becauſe it cauſes the foot to grow beyond the meaſure of the leg.

2. Shoes with calkins. Theſe are intended to keep the horſe from ſliding; but however they do him more harm than good, becauſe they prevent his treading even on the ground, by which means he is in danger of ſtraining his foot, eſpecially in ſtony places. Some indeed do not think a horſe well ſhod, unleſs all his ſhoes be made with calkins, either ſingle or double; the double ones are however leſs hurtful; for he will tread evener with them than with thoſe that are ſingle; but then they muſt neither be too long nor ſharp-pointed, but rather ſhort and flat.

3. Shoes with rings. Theſe were invented to make a horſe lift his feet high, and were deſigned for horſes that have tender hoofs: but what was intended for a remedy

a remedy, is highly prejudicial; for by adding either calkins or theſe rings to his ſhoes, his heels are made weaker than they were before.

4. Shoes with ſwelling welts, or borders round them. Theſe being higher than the heads of the nails, ſave them from wearing; and, if made of well-tempered iron, are both the beſt and moſt laſting ſhoes.

5. Some in paſſing mountains, where ſmiths are not eaſy to be met with, carry ſhoes about them, with vices to faſten them to the horſe's hoofs, without the help of hammer or nail: but tho' this ſort of ſhoe may ſave the horſe's feet from ſtones, yet they pinch his hoof, and perhaps do him more injury than the ſtones themſelves would do. On ſuch occaſions it is better to make uſe of the following ſhoe.

6. The joint-ſhoe is made of two pieces, with a flat rivet-nail joining them together at the toe, ſo that it may be made both wide or narrow, to ſerve any foot.

7. The patten-ſhoe; this is uſed for a horſe that is burnt in the hip, ſtifle or ſhoulder; as it cauſes him to bear upon that leg the grief is on, and conſequently makes him uſe it the better.

8. The panton or pantable-ſhoe, which opens the heels, and helps hoof-binding. To which may be added the half panton-ſhoe, and the ſhoe proper for flat feet.

HORSE-SHOE, in fortification, is a ſmall work ſometimes of a round and ſometimes of an oval figure, incloſed with a parapet, ſometimes raiſed in the moat or ditch, or in low grounds, and ſometimes to cover a gate, or to ſerve as a lodgment for ſoldiers.

HORSE-SHOE HEAD, a diſeaſe in infants, in which the ſutures of the ſkull lie too open.

This is commonly a ſign of a weak conſtitution, and a ſhort life. The nurſes uſually embrocate the parts affected with brandy or rum, to which ſome add the white of an egg, or palm-oil.

HORSE, in a military ſenſe, the ſame with cavalry. See the article CAVALRY.

The light horſe, in an army, are all the regiments of horſe, except the guards.

HORSE, in a ſhip, is a rope made faſt to each yard-arm, and on which the men ſtand to furl the ſails. It is alſo a wooden frame with a rowel fixed in it, made uſe of by the riggers to woold ſhips-maſts.

HORSHAM, a market-town and borough of Suſſex, ſituated twenty-miles north-weſt of Lewes, in weſt longitude 22′, north latitude 51° 10′. It ſends two members to parliament.

HORSHAM-STONE, a greyiſh kind of ſlate, formerly uſed to cover houſes, ſo called becauſe brought from Horſham.

HORTAGILERS, in the grand ſeignior's court, upholſterers, or tapiſtery-hangers. The grand ſeignior has conſtantly four hundred hortagilers in his retinue when he is in the camp: theſe go always a day's journey before him, to fix upon a proper place for his tent, which they prepare firſt; and afterwards thoſe of the officers, according to their rank.

HORTICULTURE, the ſame with gardening. See GARDEN and GARDENING.

HORTULANUS, in ornithology, a bird otherwiſe called emberiza flava, or the yellow-hammer. See EMBERIZA and YELLOW-HAMMER.

HORTUS SICCUS, a DRY-GARDEN, an appellation given to a collection of ſpecimens of plants, carefully dried and preſerved.

The value of ſuch a collection is very evident, ſince a thouſand minutiæ may be preſerved in the well-dried ſpecimens of plants, which the moſt accurate engraver would have omitted. We ſhall, therefore, give two methods of drying and preſerving an hortus ſiccus; the firſt by Sir Robert Southwell, in Phil. Tranſ. n° 237, and the other by Dr. Hill, in his review of the works of the royal ſociety, with the doctor's objections to Sir Robert's method.

According to the former gentleman, the plants are to be laid flat between papers, and then put between two ſmooth plates of iron, ſcrewed together at the corners, and in this condition committed to a baker's oven for two hours. When taken out, they are to be rubbed over with a mixture of equal parts of aquafortis and brandy; and, after this, to be faſtened down on paper, with a ſolution of the quantity of a walnut of gum tragacanth diſſolved in a pint of water.

To this the doctor objects, that the heat of an oven is much too uncertain to be employed in too nice an operation; and that the ſpace of time, ordered for the continuing the plants in it, is of no information, unleſs the degree of heat, and even the different nature of the plant, as to its more or leſs ſucculency, and the firmneſs or tenderneſs of its fibres, be attended to. There are ſcarce any two plants perfectly alike in thoſe particulars; and conſequently the heat, and duration of heat, that is ſufficient for one plant in a parcel, would deſtroy another. But beſides this, he objects farther, that the acid deſtroys the colour of many plants, never recovers that of others loſt in the drying, and frequently, after the plant is fixed down, rots both the paper it is fixed to, and that which falls over it.

As to the doctor's own method, it is as follows: take of a ſpecimen of a plant in flower, and with it one of its bottom leaves, if it have any; bruiſe the ſtalk, if too rigid; ſlit it, if too thick; ſpread out the leaves and flowers on paper; cover the whole with more paper, and lay a weight over all. At the end of eighteen hours take out the plants, now perfectly flatted; lay them on a bed of dry common ſand; ſift over them more dry ſand, to the depth of two inches, and thus let them lie about three weeks: the leſs ſucculent dry much ſooner, but they take no harm afterwards. If the floor of a garret be covered, in ſpring, with ſand two inches deep, leaving ſpace for walking to the ſeveral parts, it will receive the collection of a whole ſummer, the covering of ſand being ſifted over every parcel, as laid in. They need no farther care, from the time of laying them, till they are taken up to be ſtuck on paper. The cement uſed by the doctor is thus prepared: early in the ſpring, put two ounces of camphor into three quarts of water in a large bottle; ſhake it from time to time; and when the firſt collected plants are ready for the faſtening down, put into a pint of the water, poured off into an earthen veſſel that will bear the fire, two ounces of common glue, ſuch as is uſed by the carpenters, and the ſame quantity of ichthyocolla beat to ſhreds; let them ſtand ſix and thirty hours, then gently boil the whole a few moments, and ſtrain it off through a coarſe cloth. This is to be warmed over a gentle heat, when it is to be uſed, and the back of the plants ſmeered over thereby with a painter's bruſh: after this lay them on paper, and gently preſs them for a few minutes; then expoſe them to the air a little, and finally lay them under a ſmall weight between quires of paper to be perfectly dried.

It is ſcarce to be conceived, how ſtrongly the water becomes impregnated with the camphor by this ſimple proceſs: a part of it, indeed, flies off in the making of the cement and the uſing of it; but enough remains with the plant to prevent the breeding of inſects in it. He farther obſerves, that plants may be dried very well without ſand, by only putting them frequently into freſh quires of paper, or a few, by only preſſing them between the leaves of a book; but the ſand method preſerves the colour beſt, and is done with leaſt trouble.

Another method, much better than that of the oven is the flattening and drying the plant, by paſſing a common ſmoothing-iron for linen, over the papers between which it is laid: but for nice things, the moſt perfect of all methods is that by a common ſand-heat, ſuch as is uſed for chemical purpoſes. The cold ſand is to be ſpread ſmooth on this occaſion, the plant laid on it carefully flatted, and a thick bed of ſand ſifted over: the fire is then to be made, and the whole proceſs carefully watched, till by a very gentle heat the plant be perfectly dried. The colour of the tendereſt herb may be preſerved in this manner; and flowers that can be preſerved no way elſe, may be managed perfectly well thus.

HOSANNA, a hebrew word, ſignifying *ſave now*, or *ſave we beſeech thee*; from the frequent uſe of which, during the feaſt of tabernacles, the whole ſolemnity got the appellation of *hoſanna rabba*.

HOSE, in commerce. See STOCKING.

HOSEA, a canonical book of the Old Teſtament, ſo called from the prophet of that name, its author, who was the ſon of Beri, and the firſt of the leſſer prophets. He lived in the kingdom of Samaria, and delivered his prophecies under the reign of Jeroboam II. and his ſucceſſors, kings of Iſrael, and under the reigns of Uzziah, Jotham, Ahaz, and Hezekiah, kings of Judah. His principal deſign is to publiſh the groſs idolatries of the people of Iſrael and Judah, to denounce the divine vengeance againſt them, and to foretel the captivity in Aſſyria.

HOSPITAL, a place or building properly endowed, or otherwiſe ſupported by charitable contributions, for the reception and ſupport of the poor, aged, infirm, ſick, or helpleſs.

A charitable foundation laid thus for the ſuſtenance and relief of the poor, is to continue for ever. Any perſon ſeized of an eſtate in fee, may, by deed inrolled in chancery, erect and found an hoſpital, and nominate ſuch heads and governors therein as he ſhall think fit; and this charitable foundation ſhall be incorporated, and ſubject to the inſpection and guidance of the heads and viſitors nominated by the founder. Likewiſe ſuch corporations ſhall have, take, and purchaſe lands, ſo as not to exceed 200l. a year, provided the ſame be not held of the king; and to make leaſes, reſerving the accuſtomed yearly rent.

Beſides a multitude of alms-houſes, or ſmall hoſpitals, founded in England, particularly in and about London, by private men for the relief of the poor, there are a great many hoſpitals: the principal whereof are the,

Royal HOSPITAL for diſabled ſoldiers, commonly called Chelſea-hoſpital.

This hoſpital was founded by king Charles II. carried on by king James II. and finiſhed by king William and queen Mary. The building is very ſpacious and magnificent; the number of ordinary penſioners is about 500, beſides the officers and ſervants of the houſe: the out and extraordinary penſioners are very numerous; and theſe upon occaſion do duty in the ſeveral garriſons, from whence draughts are made for the army, &c. The penſioners are all provided with cloaths, diet, waſhing, lodging, firing, and have one day's pay in every week for ſpending-money. The qualifications required to be admitted of this body, are, that the candidate bring a certificate from his ſuperior officer that he has been maimed and diſabled in the ſervice of the crown; or that he has ſerved the crown twenty years, which muſt be made appear by the muſter-rolls. To defray the charges of this hoſpital, there is a conſiderable ſum paid yearly out of the poundage of the army; beſides one day's pay of each officer and common ſoldier every year, which in time of war amounts to a very conſiderable ſum. For the adminiſtration of this hoſpital, there is a governor, lieutenant-governor, major, treaſurer, &c.

Greenwich-HOSPITAL, a retreat for ſeamen, who, by age, wounds, or other accidents, are diſabled from ſervices; and for the widows and children of ſuch as are ſlain in the ſervice.

This in point of magnificence and ſpacioufneſs, greatly excels even Chelſea-hoſpital. A good part of it was built in king Charles II's time. It was much promoted by king William, and finiſhed under queen Anne, king George I. and II. The number of penſioners entertained in this hoſpital, are about 1200; and to each hundred are allowed five nurſes, being the widows of ſeamen. The penſioners are all cloathed in blue, and are allowed ſtockings, ſhoes, linen, and twelve-pence a week for other neceſſaries: the victualling is according to the allowance of Chelſea-hoſpital, *viz.* four men to a meſs, each meſs to contain four pounds of fleſh, a gallon of beer, &c. There are 100 boys, the ſons of diſabled ſeamen, who are maintained with the money ariſing by ſhewing the hoſpital and painting in the hall.

This hoſpital is adminiſtered by a governor, lieutenant-governor, &c.

Chriſt's HOSPITAL, by Newgate-ſtreet, formerly a convent of grey friars, being diſſolved by king Henry VIII. was converted by his ſon Edward VI. into an hoſpital for poor children, called the blue-coat hoſpital, from the blue cloathing of the children, whoſe number amounts to about 900; the greateſt part maintained in the houſe, and the others at nurſe, at the charge of the foundation. The boys are yearly put to trades, and the girls to ſome honeſt ſervice or trade. Here the boys have a grammar-ſchool, from which the moſt improved ſcholars are yearly ſent to the univerſity: there is here alſo a ſtately writing ſchool, and a mathematical ſchool, founded by king Charles II. where forty youths are taught ſeveral parts of the practical mathematics, particularly navigation, to fit them for apprentices to maſters of ſhips.

The officers of this hoſpital are a preſident, treaſurers, governors, &c.

St. Bartholomew's HOSPITAL, at a ſmall diſtance from Chriſt's hoſpital, did formerly belong to the ſame grey friars, but after the diſſolution of the monaſteries, king Henry VIII. left 500 marks a year to it for the relief of poor people: but it was much more largely endowed for the uſe of ſick and lame perſons only, by Edward VI. There are two other hoſpitals at the charge of this; one in Kingſland, and the other, called the Lock, in Southwark, for the venereal diſeaſe only. It is computed that theſe three hoſpitals relieve five thouſand poor ſick and lame perſons annually, ſix or ſeven hundred of which are in-patients at St. Bartholomew. This hoſpital is a large, ſumptuous, new building of ſtone, erected with proper offices in the nature of a quadrangle. It is provided with able phyſicians and ſurgeons, *&c.* For the direction of it there is a preſident, treaſurer, *&c.*

Bethlehem, or *bedlam* HOSPITAL, a ſtately hoſpital in Moorfields, for the cure and maintenance of poor lunatics, or diſtracted perſons. This hoſpital, for elegance of ſtructure and ſpacious conveniencies, is not to be equalled in Europe. It ſtands alſo in a good open air.

St. Thomas's HOSPITAL, in Southwark, is upon the ſame ſcheme and nature with St. Bartholomew. It is a noble extenſive charity, was founded by king Edward VI. and rebuilt in 1701.

Guy's HOSPITAL, near St. Thomas's, was founded at the ſole coſt of Thomas Guy, bookſeller of London, in 1722, who left 200,000l. to build, finiſh, and endow it. It was deſigned chiefly for incurables.

Sutton's HOSPITAL. See CHARTREUSE.

Bridewell HOSPITAL. See BRIDEWELL.

At Hoxton there is another hoſpital, founded by alderman Aſke, for twenty poor old men of the haberdaſher's company, and twenty poor boys to be there educated.

There are alſo two very beneficial charities or hoſpitals, one at Hydepark-corner, and the other in Petty-france, Weſtminſter, after the manner of thoſe in London, and both very well attended.

In 1739, a long wiſhed-for charity was eſtabliſhed by charter for taking in and educating poor deſerted young infants. The governors and guardians have purchaſed of the earl of Saliſbury fifty acres of land in Lamb's conduit-fields, on which they have erected a large building for this charitable purpoſe, called the foundling hoſpital.

About the year 1741, an infirmary or hoſpital in Goodman's fields was begun by charitable donations, for the relief of diſabled poor ſeamen in the merchant ſervice; and now a large ſtately building for this charitable undertaking is erected near White-chapel-mount.

For ſeveral other charities of a like nature, tho' leſs conſiderable, in and about London, ſee the article *Work*-HOUSE.

Camp-HOSPITALS, are either general or regimental. The general hoſpitals are of two kinds, *viz.* the flying hoſpital, attending the camp at ſome convenient diſtance, and the ſtationary hoſpital, which is fixed at one place. In the choice of both, Dr. Pringle thinks it better to have them in towns than villages, as the former will afford larger wards, beſides more of other conveniencies. Theſe wards ſhould be as airy as poſſible. Regimental hoſpitals are of the greateſt importance, and therefore ſhould be ſupplied with blankets and medicines from the public ſtores, with an allowance alſo for nurſes and other neceſſaries. Barns, ſtables, granaries, and other out-houſes, but above all churches make the beſt hoſpitals from the beginning of June to October.

HOSPITAL-FEVER, a name given to the malignant catarrhal fever, as being frequent in hoſpitals. See the article FEVER.

This ſort of fever, according to Dr. Pringle, may be owing to a great many concurring cauſes, but the principal are foul and putrid air, occaſioned by filth and impurity of any kind. Hence it is no wonder that it prevails in marſhy countries, after hot ſeaſons, and in populous cities, eſpecially if low and ill aired, unprovided with common ſhores; or where the ſtreets are narrow and foul, and the houſes dirty; water ſcarce; and when jails and hoſpitals are crowded, and not ventilated, and kept clean; when in ſickly times the burials are within the towns, and the bodies not laid deep; when ſlaughter-houſes are alſo within the walls, or when dead animals or offals are left to rot in kennels, or on dunghils; when drains are not provided to carry off any large quantity of ſtagnating and corrupted water in the neighbourhood; when fleſh meat make the greateſt part of the diet, without a proper mixture of bread, greens, wine, or other fermented liquors; from the uſe of old muſty grain, or what has been damaged by a wet ſeaſon; or, laſtly, when the fibres are relaxed by immoderate warm bathing.

When the diſeaſe comes on ſlowly, the ſymptoms are ſmall interchanges of heats and colds, trembling of the hands, interrupted ſleep, *&c.* but when it advances faſt, the above ſymptoms are in a higher degree; and beſides theſe the patient is afflicted with a great laſſitude, a nauſea, pains in the back, a conſtant pain and confuſion in the head, a dejection of ſpirits, *&c.* The method of cure varies according to the ſtate of the diſeaſe, which may be diſtinguiſhed into three periods: the firſt continuing as long as the

the perſon is able to go about; the ſecond beginning with his confinement; and the third, when the pulſe ſinks, and the ſtupor comes on.

In the firſt as well as the other period, the cure is principally to be aimed at by removing the patient out of the foul air. When this cannot be done, the ward or room ſhould be purified by making a ſucceſſion of air by means of fires, or letting it in by doors and windows, or diffuſing the ſteams of vinegar. The next thing to be done is to promote a diaphoreſis, which in this period ſhould only be attempted by mild ſudorifics, as the ſpiritus mindereri.

When the fever is confirmed, contrayerva powders, with nitre, camphor, the common ptiſan acidulated, and ſuch medicines as are good in inflammatory caſes, ought to be given. Coſtiveneſs is prevented by emollient clyſters. But opiates are dangerous both in this and the third ſtage, in which the pulſe ſinks, and ſtupor is greater, a delirium impends, and the petechiæ often appear. When this is obſerved to be the caſe, the nitre and diaphoretic medicines are to make room for a decoction of ſnake-root, to which a ſmall quantity of ſtrong water may be added. It may alſo be given in ſubſtance from two to four ſcruples a day, with ſenſible good effects. Towards the decline of the fever, an equal quantity of peruvian bark may be joined with the root. Wine is alſo an excellent cordial at this period, and may be given either made into whey, or added to the panado; being the only food proper for the patient. It may be taken from half a pint to a quart a day, according to the ſtrength of the patient. Perhaps their is no rule of more importance than to give a ſtrict charge to the attendants of the ſick never to let the patient, when low, remain above two or three hours without taking ſomething cordial and nouriſhing. If there be danger of a phrenitis coming on, it will be proper to call in the aſſiſtance of epiſpaſtics. Sinapiſms too may be uſeful when the pulſe is very much ſunk. If a diarrhœa comes on in the decline of the fever, it is to be moderated by adding a few drops of the tinctura thebaica, to the full quantity of the alexipharmic decoction; or by giving a ſpoonful or two of an aſtringent mixture. In proportion, however, to the putrid nature of the ſtools, aſtringents are to be uſed with the greateſt caution. When the fever is over, there are few but complain of a vertigo and want of reſt; a continuation of the deafneſs and other nervous ſymptoms, are frequently the conſequence of great lowneſs, in which caſe the pilulæ Mathæi are to be given at night, with analeptics, and medicines of the ſtrengthening kind.

HOSPITALERS, an order of religious knights, now known by the title of knights of Malta. See MALTA.

HOSPITIUM, a term uſed in old writers either for an inn or a monaſtery, built for the reception of ſtrangers and travellers. See INN and MONASTERY.

HOSPODAR, a title borne by the princes of Walachia and Moldavia, who receive the inveſture of their principalities from the grand ſeignior. He gives them a veſt and ſtandard: they are under his protection, and obliged to ſerve him, and he even ſometimes depoſes them; but in other reſpects they are abſolute ſovereigns within their own dominions.

HOST, *hoſpes*, denotes either a perſon who entertains another, or the perſon ſo entertained; but it is now generally uſed in the firſt of theſe ſenſes.

HOST, or HOAST, *hoſtia*, in the church of Rome, a name given to the elements uſed in the euchariſt, or rather to the conſecrated wafer; which they pretend to offer up every day, a new hoſt or ſacrifice, for the ſins of mankind.

They pay adoration to the hoſt, upon a falſe preſumption, that the elements are no longer bread and wine, but tranſubſtantiated into the real body and blood of Chriſt. See TRANSUBSTANTIATION.

HOSTAGE, a perſon given up to an enemy as a ſecurity for the performance of the articles of a treaty.

When two enemies enter into a treaty or capitulation, it is common for them mutually to give hoſtages as a ſecurity for their reciprocally performing the engagements they have entered into. An hoſtage becomes either an acceſſary or principal, according to the ſtate of things. Thus, for example, he is an acceſſary, when a prince promiſes fidelity to another prince, and gives either his ſon, or ſome great lord, as a ſecurity for his performing his promiſe without any farther ſtipulation: for then theſe hoſtages are only an additional engagement of the prince; and if he violate his word, they are not in any manner reſponſible for it. An hoſtage becomes a principal, when it is ſtipulated that he ſhall be anſwerable for the event of things. For example, if a city promiſes to ſurrender within a certain time, in caſe it is not ſuccoured, and for the ſecurity of this article gives hoſtages, theſe hoſtages are of the ſame nature as bail given to a creditor to ſecure a debt; ſo that if the ſuccour arrives within the time, the promiſe becoming void, the hoſtages are diſcharged, and cannot be detained, juſt as the bail is diſcharged, if the original debtor pays the creditor; but if the ſuccours do not arrive, and the city is guilty of a breach of faith, by refuſing to ſurrender, then the hoſtages become principal, and may be puniſhed for the breach of faith; juſt as a bail becomes the principal debtor, on the other debtor's becoming inſolvent.

An hoſtage given for another perſon is free in caſe that other perſon dies. According to the law of nations, hoſtages ought not to be put to death, unleſs they themſelves have been guilty of ſome particular crime.

HOSTILITY denotes a ſtate of war or enmity between two nations.

During a truce all acts of hoſtility are to ceaſe on both ſides.

HOT, a relative term, importing the contrary of cold. See HEAT and COLD.

HOT-BATH. See the article BATH.

HOT-BEDS, in gardening, beds made with freſh horſe-dung, or tanner's bark, and covered with glaſſes to defend them from cold winds.

By the ſkilful management of hot-beds, we may imitate the temperature of warmer climates; by which means, the ſeeds of plants brought from any of the countries within the torrid zone, may be made to flouriſh even under the poles.

The hot-beds commonly uſed in kitchen-gardens, are made with new horſe-dung mixed with the litter of a ſtable, and a few ſea-coal-aſhes, which laſt are of ſervice in continuing the heat of the dung. This ſhould remain ſix or ſeven days in a heap, and being then turned over, and the parts mixed well together, it ſhould be again caſt into a heap, where it may continue five or ſix days longer, by which time it will have acquired a due heat. Theſe hot-beds are made in the following manner: in ſome ſheltered part of the garden, dig out a trench of a length and width proportionable to the frames you intend it for; and if the ground be dry, about a foot or a foot and a half deep; but if it be wet, not above ſix inches: then wheel the dung into th opening, obſerving to ſtir every part o it with a fork, and to lay it exactly even and ſmooth on every part of the bed, laying the bottom part of the heap, which is commonly free from litter, upon the ſurface of the bed: and if it be deſigned for a bed to plant out cucumbers to remain for good, you muſt make a hole in the middle of the place deſigned for each light about ten inches over, and ſix deep, which ſhould be filled with good freſh earth, thruſting in a ſtick to ſhew the places where the holes are; then cover the bed all over with the earth that was taken out of the trench, about four inches thick, and put on the frame, letting it remain till the earth be warm, which commonly happens in three or four days after the bed is made, and then the plants may be placed in it. But if your hot-bed be deſigned for other plants, there need be no holes made in the dung; but after having ſmoothed the ſurface with a ſpade, you ſhould cover the dung about three or four inches thick with good earth, putting on the frames and glaſſes, as before. In making theſe beds, care muſt be taken to ſettle the dung cloſe with a fork; and if it be pretty full of long litter, it ſhould be trod down equally on every part. During the firſt week or ten days after the bed is made, you ſhould cover the glaſſes but ſlightly in the night, and in the day time carefully raiſe them, to let out the ſteam; but as the heat abates, the covering ſhould be increaſed, and as the bed grows cold, new hot dung ſhould be added round the ſides of it.

The hot-bed made with tanner's bark, is, however, much preferable to that deſcribed above, eſpecially for all tender exotic plants and fruits, which require an even degree of warmth to be continued for ſeveral months, which cannot be effected with horſe dung. The manner of making them is as follows: dig a trench about three feet deep, if the ground be dry; but if wet, it muſt not be above a foot deep at moſt, and muſt be raiſed two feet above the ground. The length muſt be proportioned to the frames intended to cover it, but it ſhould never be leſs than ten or twelve feet, and the width not leſs than ſix. The trench ſhould be bricked up round the ſides to the above-mentioned height of three feet, and filled in the ſpring with freſh tanner's bark that has been lately drawn out of their vats, and has lain in a round heap, for the moiſture to drain out of it, only three of four days: as it is put in, gently beat it down equally with a dung-fork; but it muſt not be trodden, which would prevent its heating, by ſettling it too cloſe: then put on the frame, covering it with glaſſes; and in about ten days or a fortnight, it will begin to heat; at which time plunge your pot of plants or ſeeds into it, obſerving not to tread down the bark in doing it. Theſe beds will continue three or four months in a good temper of heat; and if you ſtir up the bark pretty deep, and mix a load or two of freſh bark with the old when you find the warmth decline, you will preſerve its heat two or three months longer. Many lay ſome hot horſe-dung in the bottom of the trench under the bark; but this ought never to be practiſed unleſs the bed is wanted ſooner than the bark would heat of itſelf, and even then there ought only to be a ſmall quantity of dung at the bottom.

The frames which cover theſe beds, ſhould be proportioned to the ſeveral plants they are deſigned to contain; if they are to cover the ananas or pine-apple, the back part ſhould be three feet high, and the lower part fifteen inches: if the bed be intended for taller plants, the frame muſt be made of a depth proportionable to them; but if it be for ſowing of ſeeds, the frame need not be above fourteen inches high at the back, and ſeven in the front; by which means, the heat will be much greater.

Hot-house, in ſalt-making, the place where they dry the ſalt, when taken out of the boiling-pan: it is ſituated near the furnace, which, by means of funnels or tubes, conveys the heat into it.

HOTCH-POT, in law, is uſed for mixing of lands given in marriage with other lands in fee which fall by deſcent; as where a man poſſeſſed of thirty acres of land has iſſue only two daughters, and after his having given with one of them ten acres in marriage, he dies poſſeſſed of the other twenty: here ſhe that is thus married, in order to gain her ſhare of the reſt of the land, muſt put her part given in marriage in hotch-pot; that is, ſhe muſt refuſe to take the ſole profits of her lands, and cauſe it to be mingled with the other, ſo that an equal diviſion may be made of the whole between her and her ſiſter; by which means, inſtead of only her ten acres, ſhe has fifteen.

HOTTENTOT-COUNTRY, the moſt ſouthern promontory of Africa, comprehending the cape of Good Hope, and the reſt of the dutch ſettlements, ſituated between 15 and 35° of eaſt long. and between 23 and 35° of ſouth lat. Though mountainous, it is a moſt fruitful country. The hottentot-nations who inhabit the ſouthern promontory, are ſixteen in number; and as the natives are extremely uſeful to the Dutch, they ſuffer them to be governed by their own laws and cuſtoms. They are black, and in their flat noſes, thick lips, and hair, reſemble the negroes. It is remarkable, that all the women have a callous flap or ſkin which hangs over the pudenda.

HOTTONIA, WATER-VIOLET, in botany, a genus of the pentandria-monogynia claſs of plants, the flower of which conſiſts of a ſingle petal, the tube whereof is equal in length to the cup, and its limb plain, and divided into five ovato-oblong, emarginated ſegments: the fruit is a globoſe acuminated capſule, placed on the cup, and having only one cell, in which are contained a great number of round ſeeds.

HOTTS, or HUTTS, are the pounces and round balls of leather, ſtuffed, and tied to the ſpurs of fighting cocks, to keep them from hurting one another in ſparing.

HOUDEN, a market-town of the eaſt riding of Yorkſhire, fourteen miles ſouth-eaſt of York.

HOUGH and HOUGHING, in agriculture. See HOE and HOEING.

Hough, in the manege, is that joint of the hinder quarter which joins the thigh to the leg.

HOVINGHAM, a market-town of the eaſt riding of Yorkſhire, ſeventeen miles north-eaſt of York.

HOULSWORTHY, a market-town of Devonſhire, thirty-eight miles north-weſt of Exeter.

HOUND, a hunting dog, of which there are ſeveral ſorts, as the grey-hound, gaze-hound, *&c.*

The grey-hound is valued for his ſwiftneſs, ſtrength, and ſagacity in purſuing the game. Thoſe of the beſt ſort have a long body, a ſharp head, ſparkling eyes, a long mouth, and ſharp teeth; little ears with thin griſtles; a ſtraight, broad, and ſtrong breaſt; his legs long, and his belly ſmall; with broad ſhoulders, round ribs, fleſhy buttocks, but not fat, and a long tail.

The beſt time to try and train greyhounds to the game, is at twelve months old; they ſhould be kept in a ſlip while abroad, till they can ſee their courſe, and a young dog ſhould not be run till the game has been a conſiderable time on foot, leſt being over greedy of the prey, he ſtrain his limbs. The huntſman is to lead them on his left hand, if he be on foot, and on the right if on horſeback. For the method of entering greyhounds, ſee the article ENTRANCE *of hounds*.

The greyhound ought to be courſed three times a week, and rewarded with blood, which will encourage him to proſecute his game; but forget not to give the hare all the juſt advantage, that the grey-hound may ſhew his utmoſt ſtrength and ſkill before he reap the benefit of his labour. If he kill, take the hare from him, and cleaning his chops from the hare's wool, give him the liver and lights: then taking him up in your leaſh, lead him home, waſh his feet with butter and beer, put him into his kennel, and half an hour after, feed him. Upon the courſing days give him a toaſt and butter, or oil, in the morning, and nothing elſe, and then kennel him till he go to the courſe.

In the breeding of grey-hounds it ſhould be obſerved, that the beſt dog upon an indifferent bitch will not get ſo good a whelp as an indifferent dog upon the beſt bitch: that the dogs and bitches ought as near as poſſible to be of an equal age, and not to exceed four years old; however, excellent whelps are frequently produced by breeding with a young dog and an old bitch.

The general food of a grey-hound ought to be chippings, cruſts of bread, ſoft bones and griſtles; the chippings ſhould be ſcalded in beef, mutton, veal, or veniſon broth, and when it is pretty cool, made to float in good milk, and if this be given him morning and evening, it will keep him in a good ſtate of body. But if he be poor, ſickly and weak, take a ſheep's head with the wool, break it to pieces, and boil it till it is very tender, and thickening the broth with oatmeal, feed your dog with the meat and broth morning and evening. If you deſign your grey-hound for a wager, give him the following diet-bread. Take half a peck of wheat-flour, and the ſame quantity of oatmeal, and having ſcattered in it an indifferent quantity of liquorice and anniſeeds, knead it up with the whites of eggs, and bake it in ſmall loaves, then ſoak it in beef or other broths, and having walked and aired him, half an hour after ſun-riſe, and half an hour after ſun-ſet, give him ſome of it to eat.

Blood-HOUND, is a dog remarkable for the keenneſs of his ſcent: he differs from the ſcotch ſluck-hound, only in the largeneſs of his ſize, and in his not being always of the ſame colour; for theſe hounds are ſometimes red, ſanded, black, white, ſpotted, and of all the colours of the other hounds. Thoſe who have a ſquare and flat noſe always pointed to the earth, are generally thought to have the beſt ſcent; they ſhould likewiſe have a ſmall head, briſk eyes, long ears hanging down, his legs of an equal length, his breaſt not deeper than his belly, and his tail nimble.

The blood hound ſeldom barks, except in the chace; and on being ſet on by the voice of the huntſman, ſeeks about for the game, and not only keeps to it while it is living, but if it be by any accident killed or wounded, will find it out by the ſcent of the blood ſprinkled on the ground.

Gaze-HOUND. See GAZE-*Hound*.

HOUND-FISH, the engliſh name of two different ſpecies of the ſqualus. See the article SQUALUS.

1. The ſmooth hound-fiſh is the ſmooth ſkinned ſqualus, with obtuſe teeth: this is a large fiſh; the head is of a depreſſed form; the roſtrum is obtuſe; the mouth large; and the teeth are numerous, but ſhort, thick, obtuſe, and granulous; the noſtrils have each two apertures; the eyes are large, and ſtand pretty high on the head; the body is oblong, and of a rounded form; toward the head there are five apertures to the gills on each ſide, they ſtand in a line, running from the head to the pectoral fins; there are two back fins; the pinna ani is but one; the tail is forked or divided into two parts, and the upper portion is much longer than the other.

2. The ſqualus, with a rounded body, and with no pinna ani, is alſo called the hound-fiſh; the head is large, of a depreſſed figure, and ſubacute; the roſtrum, toward the extremity, is pellucid: this fiſh grows to about two yards in length.

HOUR, *hora*, in chronology, an aliquot part of a natural day, uſually a 24th, ſometimes a 12th.

But the word hour has not always been of the ſame ſignification; for in antient times an hour did indefinitely expreſs a ſhort ſpace of time. It is thought too that antiently the four ſeaſons of the year, wherein the ſun finiſheth its annual courſe, had the name of hours, becauſe Horus inſtituted a certain year, conſiſting of three months, and for this reaſon the antients called ſpring, ſummer, autumn, and winter, hours, and the year itſelf horus: of which ſome footſteps appear in this, that the Greeks called their annals *Hori*; and the writers of them *horographi.* However it be, the diviſion of the day into hours is very antient, tho' the moſt antient hour is that of the twelfth part of the day.

An hour, with us, is a meaſure or quantity of time, equal to a 24th part of the natural day, or nychthemeron; or it is the duration of the 24th part of the earth's diurnal rotation. Fifteen degrees of the equator anſwer to an hour; tho' not preciſely, yet near enough for common uſe.

The hour is divided into ſixty minutes; the minute into ſixty ſeconds; the ſecond into ſixty thirds, &c.

To find the hour of the day, the latitude of the place, the ſun's declination, and his altitude muſt be given. Thus, Suppoſe the latitude is 51° 32′, the ſun's declination 18° north, and his altitude 40°, to find the hour of the day.

The geometrical ſolution of this problem is performed by projecting ſtereographically on the plane of the meridian the oblique angled ſpherical triangle which is made by the complement of the latitude; the complement of the ſun's altitude, and the ſun's diſtance from the elevated pole. Thus, with the chord of 60° (plate CXXXIV. fig 1.) draw the primitive circle Z O N H; quarter it; alſo draw the axis P C P thro' the poles, and the equinoctial Æ C Q, likewiſe the parallel of declination D ⊙ *d* equal 18°; then draw parallel to the horizon H O, the almacanter or parallel of the ſun's altitude A *a* = 40° to cut the parallel of the ſun's declination in ⊙ the place of the ſun at that time. Then through ⊙ draw two great circles, one through Z and N the poles of the horizon, and the other thro' P and P the poles of the equinoctial, as Z ⊙ N, and P ⊙ P; which form the oblique angled ſpherical triangle P Z ⊙ and the angle Z P ⊙ meaſured on the line of half tangents gives the hour of the day from twelve, *viz.* 47° 20′ equal to 3 hours 9 minutes nearly, or to 51 minutes after eight in the morning, or 51 minutes before four in the afternoon. But by ſpherical trigonometry, having three ſides given; that is Z P 38° 28′ the complement of the latitude, Z ⊙ 50° 00′ the complement of the ſun's altitude, and P ⊙ 72° 00′ the ſun's diſtance from the elevated pole (which is the declination added to 90°, when the latitude and declination are of a contrary name; but if of one name, it is the complement of the declination:) and the angle Z P ⊙ the hour of the day is found by caſe 11. of ſpherical trigonometry, as follows.

Firſt add the complement of the latitude, complement of the ſun's altitude, and the ſun's diſtance from the elevated pole, into one ſum. Secondly, From half that ſum ſubſtract the complement of the ſun's altitude, noting the half ſum, and the remainder. Then the complement arithmetical of the ſines of the complement of the latitude, and the ſun's diſtance from the pole, and the ſines of the ſaid half ſum and remainder, added together; the ſine of half this ſum, doubled, and ſubſtracted from 180 degrees, gives the hour from noon.

Side { Z P Co. lat. 38° 28′ } containing ſides { S. co. ar.—0.206168
Side { ⊙ P Co. decl. 72° 00′ } containing ſides { S. co. ar.—0.021794
Side { Z ⊙ Co. alt. 50° 00′
Sum is, 160° 28′
Half is, 80° 14′
Co. alt. 50° 00′
Remainder 30° 14′

half ſum ſides, 80° 14′ S.—9.993660
remainder 30° 14′ S.—9.702019
ſum of the 4.—19 923641
ſine half ſum } — 9.961820
66° 20′ }
66° 20′
Which doubled gives 132° 40′

This ſubtracted from 180° 00′ leaves 47° 20′ equal to 3 hours 9′ nearly, the ſame as before.

By the ſame operation you may find the ſun's azimuth P Z ⊙, if inſtead of the complement of the ſun's altitude you ſubſtract the ſun's diſtance from the pole, noting the half ſum and remainder as before.

Fig:1. HOUR.

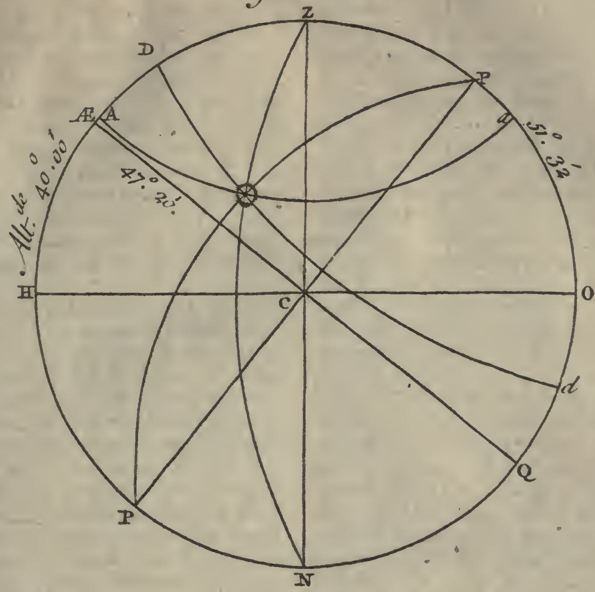
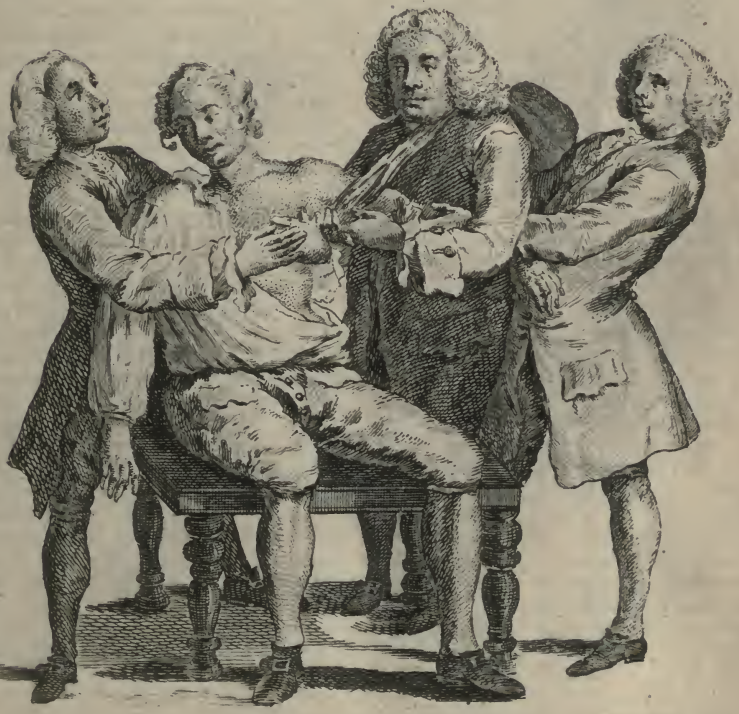


Fig:2. Reduction of a Luxated HUMERUS.



T. Jefferys Sculp.

before. And the rule will ſtand thus: To the complement arithmetical of the ſines of the complement of the latitude, and complement of the ſun's altitude, add the ſines of the aforeſaid half ſum and remainder: then the ſine of half the total of theſe four, doubled, and taken from 180 degrees, gives the ſun's azimuth from the north, in north latitude; and from the ſouth, in ſouth latitude.

If the hour of the night is required, the height of ſome ſtar muſt be taken. And it is found by adding to, or ſubſtracting the right aſcenſion of that ſtar from that of the ſun.

There are divers kinds of hours, uſed by chronologers, aſtronomers, dialiſts, &c. Sometimes hours are divided into equal and unequal. Equal hours are the 24th part of a day and night preciſely, that is, the time wherein fifteen degrees of the equator mount above the horizon. Theſe are alſo called equinoctial hours, becauſe they are meaſured on the equinoctial; and aſtronomical, becauſe uſed by aſtronomers. They are alſo differently denominated, according to the manner of accounting them in different countries. Aſtronomical hours are equal hours, reckoned from noon, or mid day, in a continued ſeries of twenty-four. Babyloniſh hours are equal hours reckoned in the ſame manner from ſun-riſe. The Italian hours, are alſo equal hours reckoned in the ſame manner too, from ſun-ſetting. European hours are alſo equal hours, reckoned from midnight; twelve from thence to noon, and twelve more from noon to midnight. Jewiſh, or planetary, or antient hours, are the twelfth part of the artificial day and night, each being divided into twelve equal parts: Hence, as it is only in the time of the equinoxes that the artificial day is equal to the night, it is then only that the hours of the day are equal to thoſe of the night: At other times they will be always either increaſing or decreaſing. And they will be the more or leſs unequal according to the obliquity of the ſphere.

HOUSE, *domus*, a habitation, or place built with conveniencies for dwelling in: thus, we ſay a town houſe, country-houſe, &c.

A country-houſe is the villa of the antient Romans, the quinta of the Spaniards and Portugueſe, the cloſerie and caſſine of the French, and the vigna of the Italians.

It ought always to have wood and water near it; theſe being the principal beauties of a rural ſeat. The trees make a far better defence than hills, as they yield a cooling, and healthy air, ſhade during the heat of ſummer, and very much break the ſeverities of the winter-ſeaſon.

It ſhould not be ſituated too low, on account of the moiſture of the air; and, on the other hand, thoſe built on places expoſed to the winds are expenſive to keep in repair. In houſes not above two ſtories high, and upon a good foundation, the length of two bricks, or eighteen inches, for the heading courſe will be ſufficient for the ground-work of any common ſtructure; and ſix or ſeven courſes above the earth, to a water-table, where the thickneſs of the walls are abated, or taken in, on either ſide the thickneſs of a brick, *viz.* two inches and a quarter. But for large and high houſes of three, four, or five ſtories, with garrets, their walls ought to be three heading courſes of bricks, or twenty-eight inches at leaſt, from the foundation to the firſt water-table; and at every ſtory a water-table, or taking in, on the inſide, for the ſummers, girders, and joiſts to reſt upon, laid into the middle, or one quarter of the wall at leaſt, for the better bond. But as for the partition wall, a brick and half will be ſufficiently thick; and for the upper ſtories, a brick length, or nine inch brick wall will ſuffice.

As to the regulations concerning the houſes in London, we have taken notice of them under the article BUILDING.

Town HOUSE, a public hall, where the magiſtrates of a town, or borough, hold their meeting for the due adminiſtration of their polity.

Work HOUSE, a place built at the charge of a county, town, or pariſh, where indigent, vagrant, and idle people, as alſo ſtrumpets, gameſters, and other rogues, are ſet to work, and furniſhed with clothing, diet, &c. Such are the London work-houſe, Bridewell, and that of the pariſh of St. Margaret, Weſtminſter.

The juſtices, at their ſeſſions, are required to appoint governors, or maſters of ſuch houſes; whoſe office is to ſet the perſons committed to their charge to work, and to give them moderate correction by whipping, &c. if refractory; and to render a true account every quarter ſeſſions, of perſons committed into their cuſtodies.

House-bote, in law, an allowance of timber out of the lord's woods, for the repairs of an houſe: this is otherwiſe called eſtovers.

House is alſo uſed for a noble family, or race of illuſtrious perſons, deſcended from the ſame ſtock.

House, in aſtrology, denotes the twelfth part of the heavens.

The diviſion of the heavens into houſes, is founded upon the pretended influence of the ſtars, when meeting in them, on all ſublunary bodies. Theſe influences are ſuppoſed to be good or bad, and to each of theſe houſes particular virtues are aſſigned, on which aſtrologers prepare and form a judgment of their horoſcopes. The horizon and meridian are two circles of the celeſtial houſes, which divide the heavens into four equal parts, each containing three houſes; ſix of which are above the horizon, and ſix below it: and ſix of theſe are called eaſtern, and ſix weſtern houſes.

A ſcheme or figure of the heavens is compoſed of twelve triangles, alſo called houſes, in which is marked the ſtars, ſigns and planets ſo included in each of theſe circles. Every planet has likewiſe two particular houſes, in which it is pretended, that they exert their influence in the ſtrongeſt manner; but the ſun and moon have each of them only one, the houſe of the former being Leo, and that of the later Cancer.

The houſes in aſtrology have alſo names given them according to their qualities; the firſt is the houſe of life; this is the aſcendant, which extends five degrees above the horizon, and the reſt below it; the ſecond is the houſe of riches: the third the houſe of brothers: the fourth, in the loweſt part of the heavens, is the houſe of relations, and the angle of the earth: the fifth, the houſe of children: the ſixth, the houſe of health: the ſeventh, the houſe of marriage, and the angle of the weſt: the eighth, the houſe of death: the ninth, the houſe of piety: the tenth the houſe of offices: the eleventh, the houſe of friends: and the twelfth, the houſe of enemies.

House-breaking, or **Robbing**, is the breaking into and robbing a houſe in the day-time, the ſame crime being termed burglary, when done by night; both are felony, without benefit of clergy. See the article Burglary.

House *of Lords*. }
House *of Commons*. } See Parliament.

Green-**House**. See the article Green.

Hot **House**. See the article Hot.

House-leek, *ſedum*, in botany. See the article Sedum.

HOUSHOLD, the whole of a family conſidered collectively, including the miſtreſs, children, and ſervants. But the houſehold of a ſovereign prince includes only the officers and domeſtics belonging to his palace.

The principal officers of his majeſty's houſhold are, the lord ſteward, lord chamberlain of the houſhold, the groom of the ſtole, the maſter of the great wardrobe, and the maſter of the horſe. The civil government of the king's houſe is under the care of the lord ſteward of the king's houſhold, who, as he is the chief officer, all his commands are obſerved and obeyed. His authority extends over all the other officers and ſervants, except thoſe of his majeſty's chapel, chamber, and ſtable, and he is the judge of all crimes committed either within the court or the verge. See the articles Steward and Verge.

Under him are the treaſurer of the houſhold, the comptroller, cofferer, the maſter of the houſhold, the clerks of the green-cloth, and the officers and ſervants belonging to the accounting-houſe, the marſhalſea, the verge, the king's kitchen, the houſhold kitchen, the acatery, bakehouſe, pantry, buttery, cellar, paſtry, *&c.* Next to the lord ſteward is the lord chamberlain of the houſhold, who has under him the vice-chamberlain, the treaſurer, and comptroller of the chamber; forty-eight gentlemen of the privy-chamber, twelve of whom wait quarterly, and two of them lie every night in the privy-chamber; the gentleman uſher, the grooms of the great chamber, the pages of the preſence-chamber; the mace-bearers, cup-bearers, carvers, muſicians, *&c.* See *Lord* Chamberlain *of the Houſhold*.

The groom of the ſtole has under him the eleven other lords of the bed-chamber, who wait weekly in the bed-chamber, and by turns lie there a nights on a pallat-bed; and alſo the grooms of the bed-chamber, the pages of the bed-chamber and back ſtairs, *&c.* See *Groom of the* Stole.

The maſter or keeper of the great wardrobe has under him, a deputy, comptroller, clerk of the robes, bruſher, *&c.* and a number of tradeſmen and artificers,

tificers, who are all ſworn ſervants to the king.

The maſter of the horſe has under his command the equeries, pages, footmen, grooms, coachmen, farriers, ſadlers, and all the other officers and tradeſmen employed in his majeſty's ſtables.

Next to the civil liſt of the king's court, is the military, conſiſting of the band of gentlemen penſioners, the yeomen of the guard, and the troops of the houſhold: of which, the two firſt guard the king above ſtairs.

When the king dines in public, he is waited upon at table by his majeſty's cup-bearers, carvers, and gentlemen ſewers; the muſicians playing all the time. The dinner is brought up by the yeomen of the guard, and the gentlemen ſewers ſet the diſhes in order. The carvers cut for the king, and the cup-bearers ſerve him the drink with one knee on the ground, after he has firſt taſted it in the cover.

HOUSING, among bricklayers, a term uſed for a tile or brick that is warped, or caſt crooked or hollow in burning.

Tiles are apt to be houſing or hollow on the ſtruck ſide, or that which was uppermoſt in the mould, and bricks on the contrary ſide.

HOUSING, or **HOUZING**, in the manege, is either boot or ſhoe-houſing: the former is a piece of ſtuff made faſt to the hinder part of the ſaddle, and covers the croupe of the horſe, either for ornament, or to cover the horſe's leanneſs, or to preſerve the rider's cloaths from being daubed with the ſweat *&c.* of the horſe.

The houſing, for ſuch as ride with ſhoes, is commonly a piece of ſcarlet cloth embroidered with gold fringe, and put round the ſaddle ſo as to cover the croupe, and deſcend to the lower part of the belly, to ſave the gentleman's ſilk ſtockings when he mounts in his ſhoes.

HOUSTONIA, in botany, a genus of the tetrandria-monogynia claſs of plants, the corolla of which conſiſts of a ſingle petal of a funnel-ſhape, with a patent limb divided into four roundiſh ſegments; the fruit is a roundiſh, didymous, bivalve capſule, with two cells, each containing a ſingle ſeed.

HOW, or **HOE**. See the article HOE.

HOWLE, among ſhip-carpenters, is ſaid of a ſhip whoſe futtocks are ſcarfed and bolted into the ground timbers, and the plank laid on them to the orlop.

HOY, in naval architecture, a ſmall veſſel fitted only with one maſt. See SHIP.

HOYE, a town of Weſtphalia, capital of a county of the ſame name, and ſubject to the elector of Hanover: eaſt long. 9°, north lat. 53° 5'.

HUBERT, or St. **HUBERT**, a town of the dutchy of Luxemburg, thirty miles ſouth-eaſt of Namur.

HUCKSTER, a perſon who ſells proviſions, or ſmall wares, by retail.

HUDSON's BAY, a large mediterranean ſea of north America, ſituated between 51° and 63° of north lat. and of unequal breadth from 130 to 35 leagues.

HUDSON's STREIGHTS, giving entrance into Hudſon's Bay, lie between 65° and 75° of weſt long.

HUDSON's RIVER, riſes near the lake Champlain, in Canada, and falls into the Atlantic, a little below the city of New-York.

HUDSON's BAY *Company*. See the article COMPANY.

HUE AND CRY, in law, the purſuit of a perſon who has committed felony on the highway.

If the party robbed, or any in the company of a perſon either robbed or murdered, go to the conſtable of the next town, and require him to raiſe hue and cry, and to purſue the offender, deſcribing him, and giving an account as near as he can, of the courſe he ſteered; the conſtable is immediately to call upon the pariſh for aid in ſeeking after the felon, and if he cannot be found within the bounds of that pariſh, then he is to give the next conſtable warning, and the the next, till the offender be apprehended, or at leaſt purſued to the ſea-ſide. If perſons are not ready at the ſummons of the ſheriff, and cry of the county to engage in the purſuit, they may be fined: and in caſe the inhabitants of any hundred, after hue and cry is made, neglect to purſue the ſame, they ſhall be liable to pay one half of the damages recoverable againſt the hundred in which the robbery was committed.

In making the hue and cry, diligent ſearch is to be made in all ſuſpected places, and not only pariſh officers, but all private perſons that purſue the hue and cry may arreſt the bodies of ſuch perſons, as in their purſuit they ſhall find any ways ſuſpicious, and carry them before a juſtice of the peace of the county where taken, and in that caſe, the arreſting a perſon, though he ſhould not be guilty, is lawful. 13 Edw I. If the offender is not taken within forty days after the robbery is committed, the party robbed may make oath before a juſtice of the peace of the county where the robbery was committed, of the time and place of the robbery, and of what money he was robbed, and that he did not know any of the robbers; and afterwards, within twenty days ſuch perſon may bring his action againſt the hundred, which muſt be ſued out within a year after the robbery. 27 Eliz. By a late ſtatute, notice of the robbery is to be inſerted in the Gazette, deſcribing the robber and robbery, &c. and proceſs againſt the hundred, is not to be ſerved on any inhabitant, except the high conſtable, who is to appear thereto, and to defend the action, &c. 8 Geo. II. c. 16.

HUEGLY, a large town in the Eaſt Indies, ſituated on an iſland in the moſt weſterly branch of the river Ganges, in the province of Bengal: eaſt long. 87° north lat. 23°.

HUEN, or WEEN. See the article WEEN.

HUERS, or CONDERS, in the herring-fiſhery. See CONDERS and FISHERY.

HUETTE, a city of Spain, in the province of New Caſtile, ſixty-ſeven miles eaſt of Madrid; weſt long. 2° 45′, north lat. 40°, 35′.

HUGONIA, in botany, a genus of the decandria-pentagynia claſs of plants, the corolla of which conſiſts of five large, roundiſh, and patent petals: the fruit is a globoſe berry, containing only one hard and ſtriated ſeed.

The hugonia, a ſhrub of eight or ten feet high, is a native of the Eaſt-Indies.

HUGUENOTS, a name given by way of contempt to the Calviniſts of France.

The name had its riſe in the year 1560; but authors are not agreed as to its origin. The moſt plauſible opinion, however, is that of Paſquer, who obſerves, that at Tours, the place where they were firſt thus denominated, the people had a notion, that an apparition or hobgoblin, called king Hugon, ſtrolled about the ſtreets in the night-time; from whence, as thoſe of the reformed religion met chiefly in the night to pray, &c. they called them huguenots, that is, the diſciples of king Hugon.

HUISSIER, a ſerjeant, uſher, or beadle.

HULKS, large veſſels uſed in ſetting the maſts of ſhips. See the article SHIP.

HULL, in the ſea-language, is the main body of a ſhip, without either maſts, yards, ſails, or rigging. Thus to ſtrike a hull in a ſtorm is to take in her ſails, and to laſh the helm on the lee-ſide of the ſhip; and to hull, or lie a hull, is ſaid of a ſhip whoſe ſails are thus taken in and helm laſhed-a-lee.

HULL, in geography, a ſtrong ſea-port town in the eaſt riding of Yorkſhire, ſituated on the river Hull, near the mouth of the Humber, thirty-two miles ſouth-eaſt of York.

It is a place of good trade, and has a yard for building men of war and other veſſels.

HULLOCK *of a ſail*, is a ſmall part of a ſail, let looſe in a great ſtorm; it is chiefly uſed in the mizen to keep the ſhip's head to the ſea, when all the reſt of the ſail is made up, except a little at the mizen-yard-arm.

HULPEN, a town of the Auſtrian Netherlands, in the province of Brabant, ſituated nine miles ſouth-eaſt of Bruſſels: eaſt long. 4° 22′, north lat. 50° 42′.

HULST, the capital of the county of Woes, in Dutch Flanders, ſituated fifteen miles north-eaſt of Ghent: eaſt long. 3° 50′, north lat. 51° 20′.

HUMAN, in general, is an appellation given to whatever relates to mankind: thus we ſay, the human ſoul, human body, human laws, &c. See the articles SOUL, BODY, &c.

In order to form a juſt idea of the human body, ſays Dr. Mead, it ought to be conſidered as an hydraulic machine contrived with the moſt exquiſite art, in which there are numberleſs tubes, properly adjuſted and diſpoſed, for the conveyance of fluids of different kinds, as the blood, animal ſpirits, lymph, &c. See the articles BLOOD, SPIRITS, &c.

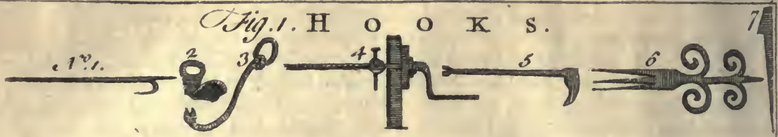
The ſolids likewiſe make a very neceſſary part of the human body; ſome, as the bones, ſerving as ſupports and levers to regulate its motions; others as the inteſtines and blood-veſſels, ſerving to prepare and convey nouriſhment to its various parts; and, finally, others, as the muſcles, acting under the direction of the mind like ſo many ropes and pullies. See the articles BONE, INTESTINES, VEIN, ARTERY, MUSCLE, &c.

As therefore health conſiſts in regular motions of the fluids, together with a proper ſtate of the ſolids, it is next to a miracle that ſo complicated a machine ſhould hold out to extreme old age: for a body, ſuch as ours, cannot poſſibly retain life for ever; which is not difficult to account for, becauſe the membranous fibres of the blood-veſſels, which were

Facing Page 1665

Plate CXXXV

Fig. 1. HOOKS.



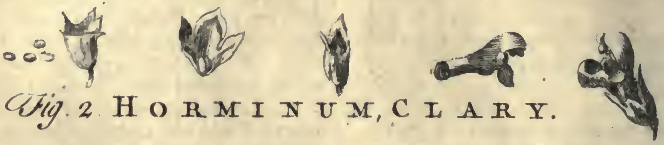


Fig. 2 HORMINUM, CLARY.

Fig: 3. Reduction of a Luxated HUMERUS.

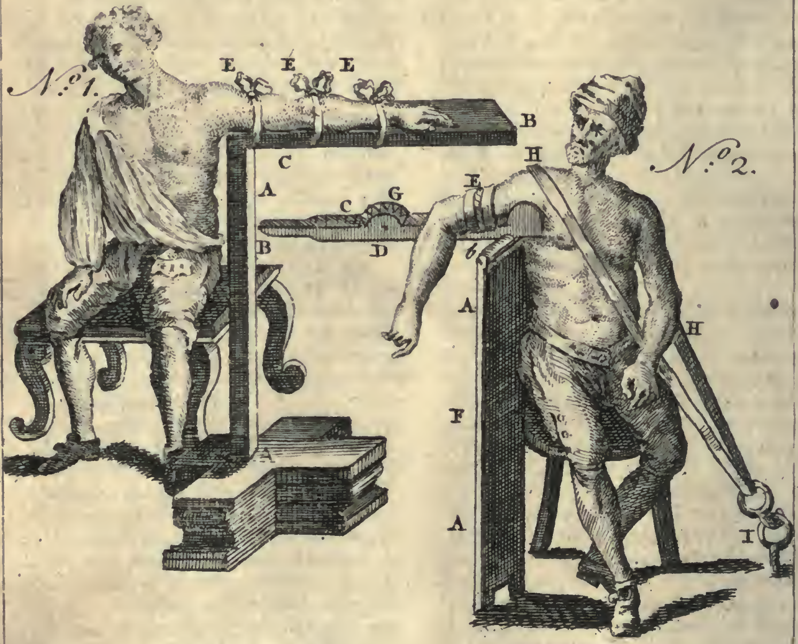


Fig: 4. Huso, the ISINGLASS-FISH.

T. Jefferys sculp.

made elaſtic in order to drive their included juices forward, become gradually harder, and at length rigid; whence they are rendered incapable of executing their offices, and the ſecretions of the ſeveral parts are diminiſhed by degrees: and that this is the caſe, appears from diſſections of the bodies of very old people; the inſides of their arteries being ſometimes found oſſified here and there, whereby they have almoſt entirely loſt their ſpringineſs; and the orifices of the natural ducts, are often obſerved to be quite cartilaginous.

HUMANITY, the peculiar nature of man, whereby he is diſtinguiſhed from all other beings. See the article MAN.

HUMANITIES, in the plural, ſignify grammar, rhetoric, and poetry, known by the name of *literæ humaniores*; for teaching of which, there are profeſſors in the univerſities of Scotland, called humaniſts. See GRAMMAR, RHETORIC, *&c.*

HUMBER, a river formed by the Trent, the Ouſe, and ſeveral other ſtreams united. It divides Yorkſhire from Lincolnſhire, and falls into the German Sea at Holderneſs.

HUMBLE BEE, the engliſh name of ſeveral ſpecies of apis, diſtinguiſhed by their colours, black, tawney, reddiſh, *&c.* See the article APIS.

HUMECTATION, in pharmacy, the moiſtening, or preparing medicines by ſteeping them in water; either to ſoften and relax their ſolid parts, or to prevent the evaporation of their more ſubtile contents.

HUMERUS, in anatomy, the upper part of the arm, between the ſcapula and elbow.

The os humeri or brachii, as it is called, is articulated at one end with the ſcapula, and at the other to the ulna and radius. See the articles ARM, BRACHIUM, *&c.*

As to the motion of the os humeri, it is evidently the moſt free and extenſive of that of any bone in the human body: being furniſhed with ſeveral flexor and extenſor muſcles. See the articles FLEXOR and EXTENSOR.

Luxation of the HUMERUS. This bone, from the length and laxity of its ligaments, the largeneſs of its motion, and the ſhallowneſs of the cavity in the ſcapula into which it is articulated, is very ſubject to be luxated.

As ſoon as this is diſcovered to be the caſe, the patient ſhould be ſeated on the floor, or on a low ſtool, while two aſſiſtants ſtretch his arm; which being ſufficiently extended, the ſurgeon ought to elevate the head of the humerus by means of a napkin, hung about his neck, and put under the arm-pit; and at the ſame time move it backward and forward, as he ſhall ſee occaſion, till it is happily reduced into its place. See plate CXXXIV. fig. 2.

However, it often happens, that this force is incapable of extending the arm ſufficiently; ſo that it becomes neceſſary to have recourſe to machines, as the ambe of Hippocrates; which conſiſts of a pillar or fulcrum A A (plate CXXXV. fig. 3. n° 1.) and the moveable lever B C, which is bound to the arm in the manner repreſented in the figure by the ligatures E E E. When this is done, the end of the lever B is carefully and gradually preſſed downward, by which means the other end C is moved upward; and thus the luxated arm is both extended, and replaced at the ſame time.

This inſtrument having received many improvements ſince the days of Hippocrates, we ſhall here give the deſcription of a portable one, invented by Mr. Freke. It conſiſts of two boxes, A, A; (plate CXXXV. fig. 3. n° 2.) joined together by a hinge, F, in the middle; wherein are contained, when folded together, every thing neceſſary for reducing a diſlocated ſhoulder.

The length of this inſtrument, when ſhut up, is one foot eight inches, its breadth nine inches, and its thickneſs three inches and a quarter. When it is opened, it is kept ſo by two hooks fixed on the backſide of it; and, when one end of it ſtands on the ground, the other ſtands high enough to become a fulcrum, or ſupport of the lever B B, which is fixed on a roller *b*, by a large wood-ſcrew, which turning ſideways, as well as with the roller, it obtains a circumrotatory motion, ſo that it will ſerve to reduce a luxation, either backward, forward, or downward. The roller on which the lever is fixed, is juſt the diameter of the depth of one of the boxes, into which are driven two iron pins, the ends of which are received by the two ſides of the box, which are an inch thick. The lever is two feet four inches long, and is cut off and joined again by two hinges C, to fold up ſo as to be contained in the boxes. On the backſide of it is a hook, to keep it ſtraight. One other end of it is to hang over the roller about an inch and a half, which is to be excavated and covered with buff leather, for the more eaſy reception of the head of the os humeri. Two iron cheeks D are ſcrewed on each ſide of the lever, to receive through them an iron roller, which has two holes through it, to receive two cords coming from a brace E, fixed on the lower head of the os humeri; for if it be applied on the muſcular part of the arm, it never fails ſlipping down to the joint, before you can extend the limb. The iron roller has a ſquare end, on which is fixed a wheel G, within the cheek notched round, which works as a ratchet, on a ſpring-ketch underneath the lever, by which it is ſtopped, as you wind it with a winch; and may at pleaſure be let looſe, as there ſhall be occaſion for it, by diſcharging the ketch. The brace E, compared with common bandages, is of more conſequence than can eaſily be imagined by unexperienced perſons. It conſiſts of a large piece of buff leather, big enough to embrace the arm, ſewed on two pieces of ſtrong iron curved plates, riveted together, one of them having an eye at each end to faſten two cords in; the other is bent at the ends into two hooks, which are to receive the cords, after they have croſſed over the arm above.

In order to keep the patient ſteady in his chair from coming forward, or letting the ſcapula riſe up on depreſſing the lever, after the limb is extended by the winch, there muſt be fixed over the ſhoulder a girth, H, H, with two hooks at the ends of it, long enough to reach to the ground on the other ſide, where it muſt be hooked into a ring I, ſcrewed into the floor for that purpoſe.

We ought not to omit obſerving here, that there are ſeveral other contrivances invented both by antient and modern ſurgeons for reducing a luxation of the humerus; ſome of which the reader will find deſcribed in Heiſter's Surgery, P. I. B. iii. c. 7.

HUMETTY, or CROSS HUMETTY, in heraldry, a plain croſs of an equal length every way. See the article CROSS.

HUMIDITY, that quality in bodies whereby they are capable of wetting other bodies. This differs very much from fluidity, and ſeems to be merely a relative thing, depending upon the congruity of the component particles of the liquor to the pores of ſuch particular bodies, as it is capable of adhering to, penetrating a little into, or wetting. Thus, for inſtance, quickſilver is not a moiſt thing with regard to our hands or clothes, but may be called ſo in reference to gold, tin, or lead, to whoſe ſurfaces it will perfectly adhere, and render them ſoft and moiſt. Even water itſelf, which almoſt wets every thing, and is the great ſtandard of moiſture and humidity, is not capable of wetting every thing, for it ſtands or runs off eaſily in globular drops from the leaves of cabbages, and many other plants, and will not wet the feathers of ducks, ſwans, and other water-fowls. Add that the texture alone may cauſe the fluid to be humid, as is plain in that neither quickſilver, lead, or biſmuth alone, will ſtick upon glaſs; yet being mixed together, they will form a maſs that will do ſo, as appears from ſuch a compoſition being frequently uſed in foliating looking-glaſſes.

HUMIDUM RADICALE, or *radical moiſture*, among phyſicians, ſeems to amount to no more than the pureſt and moſt delicate part of the nutritious matter in a condition to be aſſimilated.

By too much heat, as in fevers, hectics, &c. this humidity is too haſtily exhauſted and ſpent.

HUMILIS MUSCULUS, one of the depreſſor muſcles of the eye. See EYE.

HUMMING BIRD, *trochilus*, in ornithology, a genus of birds, of the order of the paſſeres, remarkable for being the ſmalleſt of all known birds. Their beak is of a ſubulated figure, but fine as a thread: it is longer than the head, and not perfectly ſtraight: add to this, that they have a fine tube or pipe, which they can extend beyond the point of the beak. Of this ſingular genus, there are ſeveral elegant ſpecies. 1. The leaſt ſpecies of all the humming-birds is figured (plate CXXXVI. fig. 1.) of its natural bigneſs and ſhape: the upper part of its body is of a dirty brown, and the under part of a dirty white. 2. The little brown one, variegated with dark ſpots, is likewiſe figured (*ibid.* fig. 2.) as big as life. 3. The creſted humming-bird, repreſented (*ibid.* fig. 3.) as big as the life, is a very elegant ſpecies: the top of the head, from the bill to the hinder part which ends in a creſt, is firſt green, and, towards the the hinder part, dark blue; both of a fine luſtre: the upper part of its body is a dark green, intermixed with gold-colour: the quill-feathers are of a purple-colour, and the tail is of a bluiſh black.

4.

Plate CXXXVI

HUMMING BIRDS.

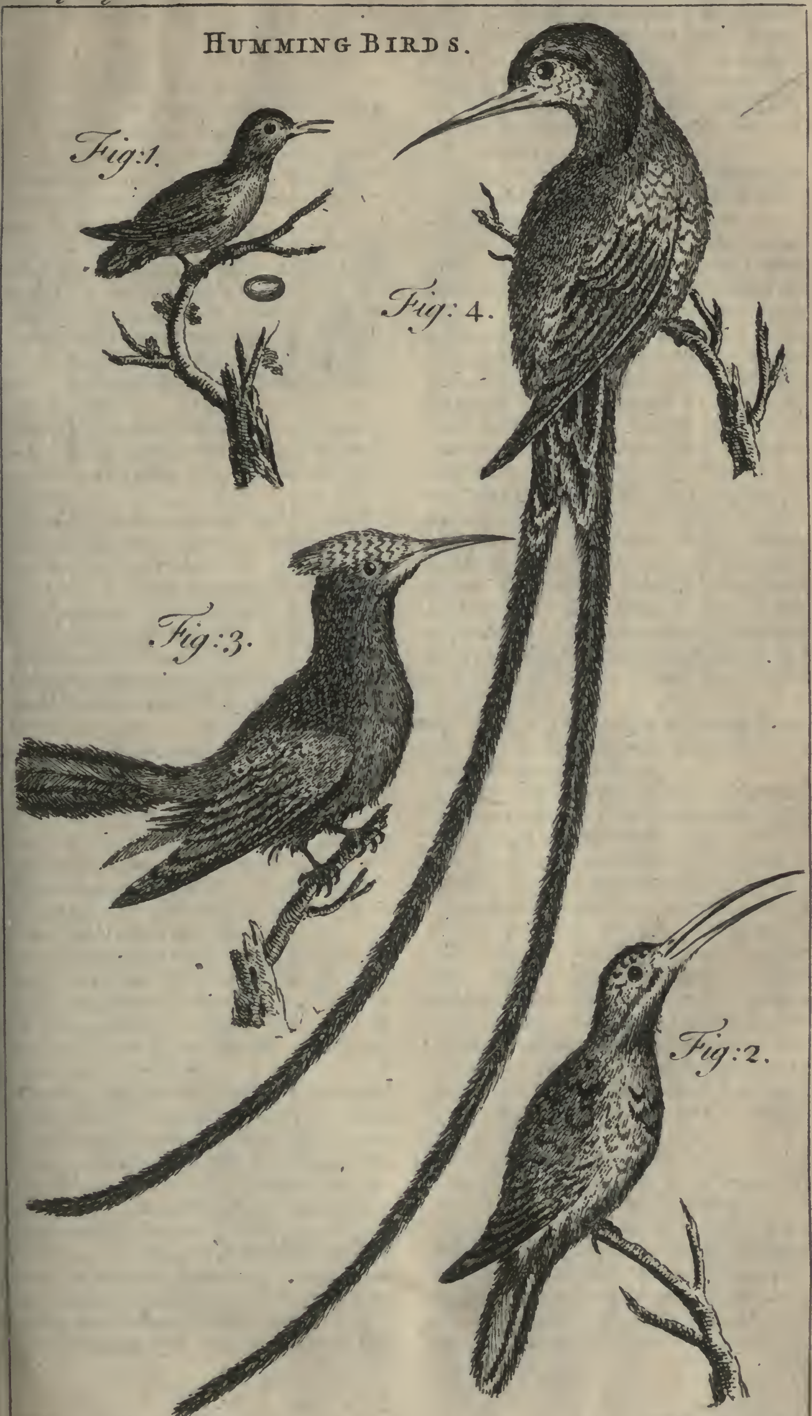


Fig: 1.
Fig: 4.
Fig: 3.
Fig: 2.

T. Jefferys Sculpt.

4. The long-tailed, black-cap humming-bird, likewiſe engraved (*ibid.* fig. 4.) of its natural bigneſs, has an extremely long tail made up of only two feathers; which being of a very looſe texture, are eaſily ruffled with the leaſt breath of air: this is one of the largeſt ſpecies.

There are a great many other ſpecies of humming-birds, a deſcription and figures of which may be ſeen in Edward's Hiſtory of Birds.

HUMORISTS, *gli humoriſti*, a celebrated academy of learned men at Rome, firſt eſtabliſhed by Paul Mancini. The device of this academy is a cloud; which being raiſed on vapours from the ſalt water of the ſea, returns again freſh, with this hemiſtich from Lucretius, *Redit agmine dulci.*

HUMOROSI, the name of another academy at Cortona in Italy, which muſt not be confounded with that of the humoriſts.

HUMOUR, *humor*, in a general ſenſe, denotes much the ſame with liquid or fluid. See the article FLUID.

The antients ſeem to have called the nutritious juices the radical humour; and to have conſtituted as a cauſe of diſeaſes, a diſproportion betwixt the innate heat and radical moiſture or humour. They alſo made four humours in the blood. See the article BLOOD.

HUMOURS *of the eye*, are the cryſtalline, vitreous, and aqueous; for a deſcription of which, ſee the articles EYE, CRYSTALLINE, &c.

HUMOUR is alſo uſed for the peculiar temper of a perſon, ariſing from the conſtitution and prevalence of this or that humour. See the articles CONSTITUTION and TEMPERAMENT.

We frequently impute to an unlucky or croſs accident, ſays the Abbé du Bos, thoſe chagrines whoſe origin is entirely in the intemperature of our humours, or in ſome diſpoſition of the air, which oppreſſes our machine.

HUMOUR, in dramatic poetry, is eſteemed a ſubordinate ſpecies of what is more uſually called manners. See MANNERS. Every paſſion wears two different faces; one ſerious and ſolemn, fit only for tragedy; and the other merry and ridiculous, called humour, and proper for comedy. The engliſh poets have excelled thoſe of all other nations in this particular: and, indeed, ours is the only language that has a name for it.

To be always witty only becomes a few characters; ſo that it is neceſſary to call in the aſſiſtance of humour, to prevent the other dramatic perſons from going into the common ſtyle and manner: hence humour may be looked on as the true ſpirit and wit of comedy. See WIT.

HUMULUS, the HOP, in botany. See the article HOP.

HUMUS, in natural hiſtory, the name by which Linnæus calls earth. See the article EARTH.

HUNDRED, *hundredum*, or *centuria*, a part or diviſion of a county, which was antiently ſo called from its containing an hundred families, or from its furniſhing an hundred able men for the king's wars. After king Alfred's dividing this kingdom into counties, and giving the government of each county to a ſheriff, theſe counties were divided into hundreds, of which the conſtable was the chief officer. The grants of hundreds were at firſt made by the king to particular perſons; but they are not now held by grant or preſcription; their juriſdiction being devolved to the county-court; a few of them only excepted, that have been by privilege annexed to the crown, or granted to ſome great ſubjects, and ſtill remain in the nature of a franchiſe.

HUNDRED WEIGHT. See the article WEIGHT.

HUNGARICUS MORBUS, a diſeaſe ſo called from its being firſt obſerved in the imperial army, in 1556.

It is thought to have been a compound fever, partaking of the nature both of the bilious and hoſpital fevers. See the article BILIOUS and HOSPITAL-FEVER.

HUNGARY, a kingdom bounded by the Carpathian mountains, which divide it from Poland, on the north; by Tranſilvania and Walachia on the eaſt; by the river Drave, which ſeparates it from Sclavonia, on the ſouth; and by Auſtria and Moravia on the weſt. It is one continued plain of 300 miles long, and is ſituated between 16° and 23° of eaſt long. and between 45° and 49° of north lat. It is now ſubject to the empreſs queen.

HUNGARY-WATER, a diſtilled water, ſo denominated from a queen of Hungary, for whoſe uſe it was firſt prepared.

Quincy gives the following directions for making it. Take of freſh gathered flowers of roſemary, two pounds; rectified ſpirits of wine, two quarts; put them together, and diſtil them immediately in balneo.

Or, take of freſh tops of roſemary, one pound and a half; proof ſpirit, one gallon; and diſtil in balneo till five pints are obtained.

HUNGER, an uneaſy ſenſation, which, creates an appetite or deſire of food. See the article FOOD.

Hunger is by ſome attributed to a ſharp acrimonious humour, which vellicates the coats of the ſtomach; others, who deny the exiſtence of any ſuch liquor, attribute it to the attrition or rubbing of the coats of the ſtomach; and others, again, account for it from the acidity of the blood.

HUNGERFORD, a market-town of Berkſhire, ſituated on the river Kennet, 24 miles weſt of Reading.

HUNGRY EVIL, among farriers, an exceſſive deſire in horſes to eat, which ſometimes proceeds from catching cold, or from travelling long in froſt and ſnow, or through barren places.

For the cure, give him great ſlices of bread, toaſted and ſteeped in ſack, to comfort his ſtomach; or give him wheat-flour in wine or milk, a quart at a time. But there is nothing better than to feed him moderately ſeveral times a day with good bean-bread well baked, or with oats well dried and ſifted.

HUNNINGHEN, a town of Germany, in the landgraviate of Alſace, ſituated on the Rhine, three miles north of Baſil: eaſt long. 7° 35′, north lat. 47° 37′.

HUNNOBY, a market-town in the eaſt riding of Yorkſhire, ſituated thirty-four miles north-eaſt of York.

HUNTER, a name given to a hunting-horſe. See the article HORSE.

HUNTING, the exerciſe or diverſion of purſuing four-footed beaſts of game. See the article GAME.

Four-footed beaſts are hunted in the fields, woods, and thickets, and that both with guns and grey-hounds.

Birds, on the contrary, are either ſhot in the air, or taken with nets and other devices, which exerciſe is called fowling; or they are purſued and taken by birds of prey, which is called hawking. See the articles FOWLING and HAWKING.

The purſuing of four-footed beaſts, as badgers, deer, does, roebucks, foxes, hares, *&c.* properly termed hunting, is a noble exerciſe, ſerving not only to recreate the mind, but to ſtrengthen the limbs, whet the ſtomach, and chear up the ſpirits. However, all ſorts of weather are not proper for hunting; high winds and rain being great obſtacles to it. In the ſpring ſeaſon, this diverſion ſhould be taken in the night-time with nets; in the ſummer, the morning is the moſt proper time for it; and in the winter, it ſhould only be followed from nine in the morning till two in the afternoon. The general rule is, that you place yourſelf under the wind, where you deſign to wait for game.

Hunting is practiſed in a different manner, and with different apparatus, according to the nature of the beaſts which are hunted, a deſcription of whom may be found under their reſpective articles.

With regard to the ſeaſons, that for hart and buck-hunting begins a fortnight after midſummer, and laſts till holy-rood-day; that for the hind and doe, begins on holy-rood-day, and laſts till candlemas; that for fox-hunting begins at chriſtmas, and holds till lady-day; that for roe-hunting begins at michaelmas, and ends at chriſtmas; hare-hunting commences at michaelmas, and laſts till the end of February; and where the wolf and boar are hunted, the ſeaſon for each begins at chriſtmas, the firſt ending at lady-day, and the latter at the purification.

When the ſportſmen have provided themſelves with nets, ſpears, and a hunting-horn, to call the dogs together; and likewiſe with inſtruments for digging the ground, the following directions will be of uſe to them in the purſuit of each ſort of game.

Badger-HUNTING. In doing this, you muſt ſeek the earths and burrows where he lies, and in a clear moonſhine-night go and ſtop all the burrows, except one or two, and therein place ſome ſacks, faſtened with drawing ſtrings, which may ſhut him in as ſoon as he ſtraineth the bag. Some uſe no more than to ſet a hoop in the mouth of the ſack, and ſo put it into the hole; and as ſoon as the badger is in the ſack and ſtraineth it, the ſack ſlippeth off the hoop and follows him into the earth, ſo he lies tumbling therein till he is taken. Theſe ſacks or bags being thus ſet, caſt off the hounds, beating about all the woods, coppices, hedges and tufts, round about, for the compaſs of a mile or two, and what badgers are abroad, being alarmed by the hounds, will ſoon betake themſelves to their burrows; and obſerve that he who is placed to watch the ſacks, muſt ſtand cloſe and upon a clear wind; otherwiſe,

wiſe the badger will diſcover him, and will immediately fly ſome other way into his burrow. But if the hounds can encounter him before he can take his ſanctuary, he will then ſtand at a bay like a boar, and make good ſport, grievouſly biting and clawing the dogs, for the manner of their fighting is lying on their backs, uſing both teeth and nails; and by blowing up their ſkins defend themſelves againſt all bites of the dogs, and blows of the men upon their noſes as aforeſaid. And for the better preſervation of your dogs, it is good to put broad collars about their necks made of grey ſkins.

When the badger perceives the terriers to begin to yearn him in his burrow, he will ſtop the hole betwixt him and the terriers, and if they ſtill continue baying, he will remove his couch into another chamber, or part of the burrow, and ſo from one to another, barricading the way before them, as they retreat, until they can go no further. If you intend to dig the badger out of his burrow, you muſt be provided with the ſame tools as for digging out a fox; and beſides, you ſhould have a pail of water to refreſh the terriers, when they come out of the earth to take breath and cool themſelves. It will alſo be neceſſary to put collars of bells about the necks of your terriers, which making a noiſe may cauſe the badger to bolt out. The tools uſed for digging out of the badger being troubleſome to be carried on men's backs, may be brought in a cart. In digging, you muſt conſider the ſituation of the ground, by which you may judge, where the chief angles are; for elſe, inſtead of advancing the work, you will hinder it. In this order you may beſiege them in their holds, or caſtles, and may break their platforms, parapets, caſemates, and work to them with mines and countermines, until you have overcome them.

Having taken a live and luſty badger, if you would make ſport, carry him home in a ſack, and turn him out in your court-yard, or ſome other incloſed place, and there let him be hunted and worried to death by your hounds.

There are the following profits and advantages which accrue by killing this animal. Their fleſh, blood, and greaſe, tho' they are not good food, yet are very uſeful for phyſicians and apothecaries for oils, ointments, ſalves, and powders for ſhortneſs of breath, the cough of the lungs, for the ſtone, ſprained ſinews, colt-aches, *&c.* and the ſkin being well dreſſed, is very warm and good for antient people, who are troubled with paralytic diſtempers.

Buck-HUNTING. Here the ſame hounds and methods are uſed, as in running the ſtag; and, indeed, he that can hunt a hart or ſtag well, will not hunt a buck ill.

In order to facilitate the chace, the gamekeeper commonly ſelects a fat buck out of the herd, which he ſhoots in order to maim him, and then he is run down by the hounds.

As to the method of hunting the buck: the company generally go out very early for the benefit of the morning, ſometimes they have a deer ready lodged, if not, the coverts are drawn till one is rouz'd; or ſometimes in a park a deer is pitched upon, and forced from the herd, then more hounds are laid on to run the chace: if you come to be at a fault, the old ſtaunch hounds are only to be relied upon till you recover him again: if he be ſunk and the hounds thruſt him up, it is called an imprime, and the company all ſound a recheat; when he is run down, every one ſtrives to get in to prevent his being torn by the hounds, fallow-deer ſeldom or never ſtanding at bay.

He that firſt gets in, cries hoo-up, to gives notice that he is down and blows a death. When the company are all come in they paunch him and reward the hounds; and generally the chief perſon of quality amongſt them *takes ſay*, that is, cuts his belly open, to ſee how fat he is. When this is done, every one has a chop at his neck, and the head being cut off is ſhewed to the hounds to encourage them to run only at male deer, which they ſee by the horns, and to teach them to bite only at the head: then the company all ſtanding in a ring, one blows a ſingle death, which being done all blow a double recheat, and ſo conclude the chace with a general halloo of hoo-up, and depart the field to their ſeveral homes, or to the place of meeting; and the huntſman, or ſome other, hath the deer caſt acroſs the buttocks of his horſe, and ſo carries him home.

Fox-HUNTING makes a very pleaſant exerciſe, and is either above or below ground.

1. Above ground. To hunt a fox with hounds, you muſt draw about groves,

thickets, and buſhes near villages. When you find one, it will be neceſſary to ſtop up his earth the night before you deſign to hunt, and that about midnight, at which time he is gone out to prey: this may be done, by laying two white ſticks acroſs in his way, which he will imagine to be ſome gin or trap laid for him; or elſe, they may be ſtopped up with black-thorns and earth mixed together.

At firſt, only caſt off your ſure finders, and as the drag mends, add more as you dare truſt them. The hound firſt caſt off ſhould be old and ſtaunch, and when you hear ſuch a hound call on merrily, you may caſt off ſome others to him; and when they run it on the full cry, caſt off the reſt: thus you ſhall complete your paſtime. The words of comfort are the ſame which are uſed in other chaces. The hounds ſhould be left to kill the fox themſelves, and to worry and tear him as as much as they pleaſe: ſome hounds will eat him with eagerneſs.

When he is dead, hang him at the end of a pike-ſtaff, and halloo in all your hounds to bay him; but reward them with nothing belonging to the fox, for it is not good, neither will the hounds in common eat it.

2. Under ground. If in caſe a fox does ſo far eſcape as to earth, countrymen muſt be got together with ſhovels, ſpades. mattocks, pickaxes, *&c.* to dig him out, if they think the earth not too great. They make their earths as near as they can in ground that is hard to dig, as in clay, ſtony ground, or amongſt the roots of trees; and their earths have commonly but one hole; and that is ſtraight a long way in before you come at their couch. Sometimes craftily they take poſſeſſion of a badger's old burrow, which hath a variety of chambers, holes, and angles.

Now to facilitate this way of hunting the fox: the huntſmen muſt be provided with one or two terriers to put into the earth after him, that is to fix him into an angle; for the earth often conſiſts of many angles: the uſe of the terrier is to know where he lies, for as ſoon as he finds him he continues baying or barking, ſo that which way the noiſe is heard that way dig to him. Your terriers muſt be garniſhed with bells hung in collars, to make the fox bolt the ſooner; beſides the collars will be ſome ſmall defence to the terriers.

The inſtruments to dig withal are theſe; a ſharp pointed ſpade, which ſerves to begin the trench, where the ground is hardeſt, and broader tools will not ſo well enter; the round hollowed ſpade, which is uſeful to dig among roots, having very ſharp edges; the broad flat ſpade to dig withal, when the trench has been pretty well opened, and the ground ſofter; mattocks and pickaxes to dig in hard ground, where a ſpade will do but little ſervice; the coal-rake to cleanſe the hole, and to keep it from ſtopping up; clamps, wherewith you may take either fox or badger out alive to make ſport with afterwards. And it would be very convenient to have a pail of water to refreſh your terriers with, after they are come out of the earth to take breath.

After this manner you may beſiege a fox, *&c.* in their ſtrongeſt holes and caſtles, and may break their caſemates, platforms, parapets, and work to them with mines and countermines till you have obtained what you deſired. But for the managing theſe dogs. ſee TERRIER.

Hare-HUNTING. As, of all chaces, the hare makes the greateſt paſtime; ſo it gives no ſmall pleaſure, to ſee the craft of this ſmall animal for her ſelf-preſervation. If it be rainy, the hare uſually takes to the high-ways; and if ſhe come to the ſide of a young grove, or ſpring, ſhe ſeldom enters, but ſquats down till the hounds have over-ſhot her; and then ſhe will return the very way ſhe came, for fear of the wet and dew that hangs on the boughs. In this caſe, the huntſman ought to ſtay an hundred paces before he comes to the wood-ſide, by which means he will perceive whether ſhe returns as aforeſaid, which if ſhe do, he muſt halloo in his hounds, and call them back, and that preſently, that the hounds may not think it the counter ſhe came firſt.

The next thing that is to be obſerved, is the place where the hare ſits, and upon what wind ſhe makes her form, either upon the north or ſouth wind; ſhe will not willingly run into the wind, but run upon a-ſide, or down the wind; but if ſhe form in the water, it is a ſign ſhe is foul and meaſled: if you hunt ſuch a one, have a ſpecial regard all the day to the brook-ſides, for there, and near plaſhes, ſhe will make all her croſſings, doublings, *&c.*

Some hares have been ſo crafty, that as ſoon as they have heard the ſound of a horn, they would inſtantly ſtart out of their form, tho' it was at the diſtance of a quarter of a mile, and go and ſwim in ſome pool, and reſt upon ſome ruſh bed in the midſt of it; and would not ſtir from thence till they have heard the horn again, and then have ſtarted out again, ſwimming to land, and have ſtood up before the hounds four hours before they could kill them, ſwimming and uſing all ſubtilties and croſſings in the water. Nay, ſuch is the natural craft and ſubtilty of a hare, that ſometimes, after ſhe has been hunted three hours, ſhe will ſtart a freſh hare, and ſquat in the ſame form. Others having been hunted a conſiderable time, will creep under the door of a ſheep coat, and there hide themſelves among the ſheep; or when they have been hard hunted, will run in among a flock of ſheep, and will by no means be gotten out from among them, till the hounds are coupled up and the ſheep driven into their pens. Some of them (and that ſeems ſomewhat ſtrange) will take the ground like a coney, and that is called, *going to the vault.* Some hares will go up one ſide of the hedge, and come down the other, the thickneſs of the hedge being the only diſtance between the courſes. A hare that has been ſorely hunted, has got upon a quickſet hedge, and ran a good way upon the top thereof, and then leapt off upon the ground. And they will frequently betake themſelves to furzbuſhes, and will leap from one to the other, whereby the hounds are frequently in default.

Having found where a hare hath relieved in ſome paſture or corn-fields, you muſt then conſider the ſeaſon of the year, and what weather it is; for if it be in the ſpring-time or ſummer, a hare will not then ſet in buſhes, becauſe they are frequently infeſted with piſmires, ſnakes, and adders; but will ſet in cornfields, and open places. In the winter-time, they ſet near towns and villages, in tufts of thorns and brambles, eſpecially when the wind is northerly or ſoutherly. According to the ſeaſon and nature of the place where the hare is accuſtomed to ſit, there beat with your hounds, and ſtart her; which is much better ſport than trayling of her from her relief to her form.

After the hare has been ſtarted, and is on foot, then ſtep in where you ſaw her paſs, and halloo in your hounds, until they have all undertaken it, and go on with it in full cry; then recheat to them with your horn, following fair and ſoftly at firſt, making not too much noiſe either with horn or voice; for at the firſt, hounds are apt to overſhoot the chace through too much heat. But when they have run the ſpace of an hour, and you ſee the hounds are well in with it, and ſtick well upon it, then you may come in nearer with the hounds, becauſe by that time their heat will be cooled, and they will hunt more ſoberly. But, above all things, mark the firſt doubling, which muſt be your direction for the whole day; for all the doublings that ſhe ſhall make afterwards will be like the former, and according to the policies that you ſhall ſee her uſe, and the place where you hunt, you muſt make your compaſſes great or little, long or ſhort, to help the defaults, always ſeeking the moiſteſt and moſt commodious places for the hounds to ſcent in.

To conclude; thoſe who delight in hunting the hare, muſt riſe early, leſt they be deprived of the ſcent of her foot-ſteps.

Hart or Stag-HUNTING. Geſner, ſpeaking of hart-hunting, obſerves, that this wild, deceitful, and ſubtile beaſt frequently deceives its hunter, by windings and turnings. Wherefore, the prudent hunter muſt train his dogs with words of art, that he may be able to ſet them on, and take them off again at pleaſure.

Firſt of all, he ſhould encompaſs the beaſt in her own layer, and ſo unharbour her in the view of the dogs, that ſo they may never loſe her ſlot or footing. Neither muſt he ſet upon every one, either of the herd, or thoſe that wander ſolitary alone, or a little one, but partly by ſight, and partly by their footing and ſumets, make a judgment of the game, and alſo obſerve the largeneſs of his layer.

The huntſman, having made theſe diſcoveries in order to the chace, takes off the couplings of the dogs, and ſome on horſeback, the others on foot, follow the cry, with the greateſt art, obſervation, and ſpeed, remembering and intercepting him in his ſubtile turnings and headings; with all agility leaping hedges, gates, pales, ditches: neither fearing thorns, down hills nor woods, but mounting freſh horſe, if the firſt tire; follow the largeſt head of the whole herd, which muſt be ſingled out of the chace; the dogs perceiving, muſt follow; not following any other. The dogs are animated to the ſport by the winding of horns, and the voices of the huntſmen.

But

But ſometimes the crafty beaſt ſends forth his little ſquire to be ſacrificed to the dogs and hunters, inſtead of himſelf, lying cloſe the mean time. In this caſe, the huntſman muſt ſound a retreat, break off the dogs, and take them in, that is, leam them again, until they be brought to the fairer game; which riſeth with fear, yet ſtill ſtriveth by flight, until he be wearied and breathleſs. The nobles call the beaſt a wiſe hart, who, to avoid all his enemies, runneth into the greateſt herds, and ſo brings a cloud of error on the dogs, to obſtruct their farther purſuit; ſometimes alſo beating ſome of the herd into his footings, that ſo he may the more eaſily eſcape, by amuſing the dogs. Afterwards he betakes himſelf to his heels again, ſtill running with the wind, not only for the ſake of refreſhment, but alſo becauſe by that means he can the more eaſily hear the voice of his purſuers, whether they be far from him, or near to him. But at laſt being again diſcovered by the hunters and ſagacious ſcent of the dogs, he flies into the herds of cattle, as cows, ſheep, &c. leaping on a cow or ox, laying the fore parts of his body thereon, that ſo touching the earth only with his hinder feet, he may leave a very ſmall or no ſcent at all behind, for the hounds to diſcern. But their uſual manner is, when they ſee themſelves hard beſet, and every way intercepted, to make force at their enemy with their horns, who firſt comes upon him, unleſs they be preventing by ſpear or ſword. When the beaſt is ſlain, the huntſman with his horn windeth the fall of the beaſt, and then the whole company comes up, blowing their horns in triumph for ſuch a conqueſt; among whom, the ſkilfulleſt opens the beaſt, rewards the hounds with what properly belongs to them, for their future encouragement; for which purpoſe the huntſmen dip bread in the ſkin and blood of the beaſt, to give to the hounds.

It is very dangerous to go in to a hart at bay, of which there two ſorts, one on land and the other in water. Now if the hart be in a deep water, where you cannot well come at him, then couple up your dogs; for ſhould they continue long in the water, it would endanger their ſurbating or foundering. In this caſe, get a boat, and ſwim to him, with dagger drawn, or elſe with rope that has a nooſe, and throw it over his horns; for if the water be ſo deep that the hart ſwims, there is no danger in approaching him; otherwiſe you muſt be very cautious.

As to a land-bay, if a hart be burniſhed, then you muſt conſider the place; for if it be in a plain and open place, where there is no wood nor covert, it is dangerous and difficult to come in to him; but if he be on a hedge-ſide, or in a thicket, then, while the hart is ſtaring on the hounds, you may come ſoftly and covertly behind him, and cut his throat. If you miſs your aim, and the hart turn head upon you, then take refuge at ſome tree; and when the hart is at bay, couple up your hounds; and when you ſee the hart turn head to fly, gallop in roundly to him, and kill him with your ſword.

Directions at the death of a HART *or* BUCK. The firſt ceremony, when the huntſman comes in to the death of a deer, is to cry, *ware haunch*, that the hounds may not break in to the deer; which being done, the next is the cutting his throat, and there blooding the youngeſt hounds, that they may the better love a deer, and learn to leap at his throat: then the mort having been blown, and all the company come in, the beſt perſon, who hath not taken ſay before, is to take up the knife that the keeper or huntſman is to lay acroſs the belly of the deer, ſome holding by the fore-legs, and the keeper or huntſman drawing down the pizzle, the perſon who takes ſay, is to draw the edge of the knife leiſurely along the middle of the belly, beginning near the briſket, and drawing a little upon it, enough in the length and depth to diſcover how fat the deer is; then he that is to break up the deer, firſt ſlits the ſkin from the cutting of the throat downwards, making the arber, that ſo the ordure may not break forth, and then he paunches him, rewarding the hounds with it.

In the next place, he is to preſent the ſame perſon, who took ſay, with a drawn hanger, to cut off the head of the deer. Which being done, and the hounds rewarded, the concluding ceremony is, if it be a ſtag, to blow a tripple mort; and if a buck, a double one; and then all who have horns, blow a recheat in concert, and immediately a general whoop, whoop.

Otter-HUNTING is performed with dogs, and alſo with a ſort of inſtruments, called otter-ſpears; with which when they find themſelves wounded, they make to land, and fight with the dogs, and that moſt furiouſly, as if they were ſenſible that cold water would annoy their green wounds.

There is indeed craft to be uſed in hunting them; but they may be catched in ſnares under water, and by river ſides; but great care muſt be taken, for they bite ſorely and venomouſly; and if they happen to remain long in the ſnare, they will not fail to get themſelves free by their teeth.

In hunting them, one man muſt be on one ſide of the river, and another on the other, both beating the banks with dogs; and the beaſt not being able to endure the water long, you will ſoon diſcover if there be an otter or not in that quarter; for he muſt come out to make his ſpraints, and in the night ſometimes to feed on graſs and herbs.

If any of the hounds finds out an otter, then view the ſoft grounds and moiſt places, to find out which way he bent his head; if you cannot diſcover this by the marks, you may partly perceive it by the ſpraints; and then follow the hounds, and lodge him as a hart or deer. But if you do not find him quickly, you may imagine he is gone to couch ſomewhere farther off from the river; for ſometimes they will go to feed a conſiderable way from the place of their reſt, chooſing rather to go up the river than down it. The perſons that go a hunting otters, muſt carry their ſpears, to watch his vents, that being the chief advantage; and if they perceive him ſwimming under water, they muſt endeavour to ſtrike him with their ſpears, and if they miſs, muſt purſue him with the hounds, which, if they be good and perfectly entered, will go chanting and trailing along by the river ſide, and will beat every root of a tree, and oſier-bed, and tuft of bull-ruſhes; nay, they will ſometimes take water, and bait the beaſt, like a ſpaniel, by which means he will hardly eſcape.

Roe-buck-HUNTING is performed divers ways, and very eaſily in the woods.

When chaſed, they uſually run againſt the wind, becauſe the coolneſs of the air refreſhes them in their courſe; therefore the huntſmen place their dogs with the wind: they uſually, when hunted, firſt take a large ring, and afterwards hunt the hounds. They are alſo often taken by counterfeiting their voice, which a ſkilful huntſman knows how to do by means of a leaf in his mouth. When they are hunted, they turn much and often, and come back upon the dogs directly; and when they can no longer endure, they take ſoil, as the hart does, and will hang by a bough in ſuch a manner; that nothing of them ſhall appear above the water but their ſnout, and they will ſuffer the dogs to come juſt upon them before they will ſtir.

The veniſon of a roe-buck is never out of ſeaſon, being never fat, and therefore they are hunted at any time; only that ſome favour ought to be ſhown the doe, while ſhe is big with fawn, and afterwards till her fawn is able to ſhift for himſelf; but ſome roe-does have been killed with five fawns in their bellies.

He is not called, by the ſkilful in the art of hunting, a great roe-buck, but a fair roe buck; the herd of them is called a bevy: and if he hath not bevy-greaſe upon his tail, when he is broken up, he is more fit to be dog's meat than man's meat. The hounds muſt be rewarded with the bowels, the blood, and feet ſlit aſunder, and boiled altogether: this is more properly called a doſe, than a reward.

HUNTING MATCH. The firſt thing that is to be conſidered by one who deſigns to match his horſe for his own advantage, and his horſe's credit, is not to flatter himſelf with the opinion of his horſe, by fancying that he is a ſwift, when he is but a ſlow galloper; and that he is a whole-running-horſe (that is, that he will run four miles without a ſob at the height of his ſpeed) when he is not able to run two or three. Very probably ſome gentlemen are led into this error, by their being miſtaken in the ſpeed of their hounds, who, for want of trying them againſt other dogs that have been really fleet, have ſuppoſed their own to be ſo, when, in reality, they are but of a middling ſpeed: and becauſe their horſe, when trained, was able to follow them all day, and upon any hour, to command them upon deep as well as light earths, have therefore made a falſe concluſion, that their horſe is as ſwift as the beſt; but upon trial againſt a horſe that has been rightly trained after hounds that were truly fleet, have bought their experience perhaps full dear. Therefore it is adviſeable for all lovers of hunting to procure two or three couple of tried hounds, and once or twice a week to follow after them a train-ſcent, and when he is able to top them on all ſorts of earth, and to endure heats and colds ſtoutly, then he may better rely on his ſpeed and toughneſs.

That horſe which is able to perform a

hare-chace of five or ſix miles briſkly and courageouſly, till his body be as it were bathed in ſweat; and then, after the hare has been killed, in a nipping froſty morning, can endure to ſtand till the ſweat be frozen on his back, ſo that he can endure to be pierced with the cold as well as the heat; and then even in that extremity of cold, to ride another chaſe as briſkly and with as much courage as he did the former; that horſe which can thus endure heats and colds, is moſt valued by ſportſmen. Therefore, in order to make a judgment of the goodneſs of a horſe, obſerve him after the death of the firſt hare, if the chace has been any thing briſk; if when he is cold, he ſhrinks up his body, and draws his legs up together, it is an infallible ſign of want of vigour and courage: the like may be done by the ſlackening of his girths after the firſt chace, and from the dulneſs of his teeth, and the dulneſs of his countenance, all which are true tokens of faintneſs, and being tired; and ſuch a horſe is not to be relied on, in caſe of a wager.

Here it will not be improper to take notice of the way of making matches in former times, and the modern way of deciding wagers. The old way of trial was, by running ſo many train-ſcents after hounds, as was agreed upon between the parties concerned, and a bell-courſe, this being found not ſo uncertain, but more durable than hare-hunting; and the advantage conſiſted in having the trains led on earth moſt ſuitable to the qualifications of the horſes. But now others chooſe to hunt the hare till ſuch an hour, and then to run this wild-gooſe-chace, a method of racing that takes its name from the manner of the flight of wild-geeſe, which is generally one after another; ſo the two horſes after running of twelveſcore yards, had liberty, which horſe ſoever could get the leading, to ride what ground he pleaſed, the hindmoſt horſe being bound to follow him, within a certain diſtance agreed on by articles, or elſe to be whipped up by the triers or judges which rode by; and whichever horſe could diſtance the other, won the match.

But this chace was found by experience ſo inhuman, and ſo deſtructive to good horſes, eſpecially when two good horſes were matched; for neither being able to diſtance the other, till both were ready to ſink under their riders through weakneſs, oftentimes the match was fain to be drawn, and left undecided, though both the horſes were quite ſpoiled.

This brought up the cuſtom of train-ſcents, which afterwards was changed to three heats, and a ſtraight courſe; and that the lovers of horſes might be encouraged to keep good ones, plates have been erected in many places of England. The fewer of theſe before you come to the courſe, if your horſe be fiery and mettled, the better, and the ſhorter the diſtance, the better. Alſo, above all things, be ſure to make your bargain to have the leading of the firſt train, and then make choice of ſuch grounds where your horſe may beſt ſhow his ſpeed, and the fleeteſt dogs you can procure: give your hounds as much law before you as your triers will allow, and then, making a looſe, try to win the match with a wind; but if you fail in this attempt, then bear your horſe, and ſave him for the courſe; but if your horſe be ſlow, but well-winded, and a true ſpurred nag, then the more train-ſcents you run before you come to the ſtraight courſe, the better. But here you ought to obſerve to gain the leading of the firſt train; which, in this caſe you muſt lead upon ſuch deep earths, that it may not end near any light ground: for this is the rule received among horſemen, that the next train is to begin where the laſt ends, and the laſt train is to be ended at the ſtarting-place of the courſe; therefore remember to end your laſt on deep earths, as well as the firſt.

HUNTINGDON, the capital of Huntingdonſhire, ſituated on the river Ouſe, fifty-ſix miles north of London: weſt long. 15′, and north lat. 52° 23′.

It ſends two members to parliament.

HUQUAM, a province of China, bounded by Honan on the north, and by Quamſi and Canton on the ſouth; lying between 25° and 30° of north latitude.

HURA, the SAND-BOX-TREE, in botany, a genus of the monoecia-monadelphia claſs of plants, the male flowers of which are aranged in an imbricated amentum; the antheræ are ſeſſile, and adhere to the amentum; the female flower has neither calyx nor corolla; its ſtyle is funnel-ſhaped, and the fruit is a capſule conſiſting of twelve cells, in each of which is contained a ſingle ſeed.

HURDLES, in fortification, twigs of willows or oſiers interwoven cloſe together, ſuſtained by long ſtakes, and uſually laden with earth.

Hurdles, called alſo clays, are made

in the figure of a long ſquare; the length being five or ſix feet, and the breadth three, or three and an half: the cloſer they are woven, the better. They ſerve to render batteries firm, or to conſolidate the paſſage over muddy ditches: or to cover traverſes and lodgments, for the defence of the workmen, againſt the fire-works, or the ſtones, that may be thrown againſt them.

Hurdles, in huſbandry, certain frames, made either of ſplit timber, or of hazel-rods, wattled together, to ſerve for gates in incloſures, or to make ſheepfolds, &c.

HURDS, or **Hords**, *of flax*, or *hemp*, the coarſer parts ſeparated in the dreſſings, from the tear or fine ſtuff.

HURLE-BONE, in a horſe, a bone near the middle of the buttock, very apt to go out of its ſockets with a hurt or ſtrain.

HURLERS, a number of large ſtones ſet in a ſquare figure, near St. Clare, in Cornwal, ſo called from an odd opinion held by the common people, that they are ſo many men petrified, or changed into ſtones, for profaining the ſabbath-day, by hurling the ball, an exerciſe for which the people of that county have been always famous. The hurlers are oblong, rude, and unhewed. Some ſuppoſe them to have been trophies erected in memory of ſome battle; others take them for boundaries, to diſtinguiſh lands; and others hold them to be ſepulchral monuments.

HURON, a vaſt lake of north America, ſituated between 84° and 89° weſt long. and between 43° and 46° north lat. from whence the country contiguous to it is called the country of the Hurons, whoſe language is ſpoken over a great extent in the ſouthern parts of north America. See the article Algonquin.

HURRERS, a name formerly given to the cappers and hat-makers of London.

HURRICANE, a furious ſtorm of wind, owing to a contrariety of winds. See the article Wind and Whirlwind.

Hurricanes are frequent in the Weſt-indies, where they make terrible ravages, by rooting up trees, deſtroying houſes and ſhipping, and the like.

The natives, it is ſaid, can foretel hurricanes by the following prognoſtics: 1. All hurricanes happen either on the day of the full, change, or quarter of the moon. 2. From the unuſual redneſs of the ſun, the great ſtillneſs and at the ſame time turbulence of the ſkies, ſwelling of the ſea, and the like, happening at the change of the moon, they conclude there will be a hurricane next full-moon; and if the ſame ſigns be obſerved on the full moon, they may expect one next new-moon.

As to the cauſe of hurricanes, they undoubtedly ariſe from the violent ſtruggle of two oppoſite winds. Now as the wind betwixt the tropics is generally eaſterly, and upon the ſun's going back from the northern tropic, the weſtern winds pour down with violence upon thoſe parts, the oppoſition of theſe contrary winds cannot fail to produce an hurricane.

Hurricanes ſhift not through all the points of the compaſs, but begin always with a north wind, veer to the eaſt, and then ceaſe; and their ſhifting between theſe two points is ſo ſudden and violent, that it is impoſſible for any ſhip to veer with it; whence it happens that the ſails are carried away, yards and all, and ſometimes the maſts themſelves wreathed round like an oſier.

HUSBAND, *maritus*, a man joined or contracted with a woman in marriage.

By marriage the huſband has power over his wife's perſon; but if he threaten to kill her, &c. ſhe may make him find ſurety of the peace: he has likewiſe power over the wife's eſtate; and if ſhe have fee, he gains a freehold in her right. He alſo gains her chattles real, as terms for years, &c. and all perſonal chattels in the poſſeſſion of the wife, are the huſband's; but where the wife is out of poſſeſſion, or the chattels are debts, or things in action, in caſe they are not recovered by him and his wife, the huſband ſhall not be entitled to have them. A huſband cannot alien the lands of his wife, only by fine wherein ſhe joins; or make leaſes of her eſtate, but where ſhe is made a party, and the rent reſerved to huſband and wife, and the heirs of the wife, &c. nor ſhall the wife's own acts, as to her eſtate, bind even herſelf without a fine levied, when ſhe is examined by writ, if ſhe does it freely, &c.

The huſband ſhall be tenant by the courteſy of his wife's land, after her death, where iſſue is born between them; and the wife ſhall have dower in her huſband's lands, after his deceaſe; alſo her neceſſary apparel, &c. and if ſhe ſurvives the huſband, ſhe ſhall have her terms for years, or chattels real, again, where the huſband has not altered the property: yet in a huſband's life-time the wife is diſabled to make any contract without his conſent, unleſs it is for neceſſaries according to his degree and eſtate; and notwithſtanding ſhe may uſe the goods of her huſband, ſhe may not diſpoſe of, or pawn them; though, if ſhe take them away, it is not felony in her. As a huſband is not obliged by his wife's contract, without notice and aſſent; ſo he is not bound by the receipt of his wife, for his money. Although a wife be very lewd, if ſhe lives with her huſband, he is chargeable for all neceſſaries for her; and ſo he is in caſe he runs away from her, or turns her away. It is otherwiſe if ſhe goes away from the huſband: then, as ſoon as ſuch ſeparation is notorious, whoever gives her credit, does it at his peril, and her huſband is not liable, unleſs he takes her again; though here, if the huſband receives her, or comes after her, and lies with her but one night, that may make him chargeable for her debts.

HUSBANDRY, denotes much the ſame with agriculture. See AGRICULTURE. As there is no ſubject of more general advantage than the cultivation of lands, we have given the operations and improvements thereof, under a great variety of articles, as PLOWING, FALLOWING, INCLOSURE, DRAINS, HEDGE, DITCH, SOWING, HOEING, CORN, PASTURE, HAY, *&c.*

The New Method of Horſe-hoeing Huſbandry, written by the ingenious Jethro Tull, has now been publiſhed ſome years, ſo that a pretty good judgment may be formed of the performance. See the article HOEING.

Every man, who has conſidered the principles upon which this method of culture is founded, may diſcern how far his theory is conſiſtent with nature: though, it is probable, few have as yet made ſufficient experiments, to be fully informed of its worth. How it has happened, that what propoſes ſuch advantages, has been ſo long neglected in this country, may be matter of ſurprize to thoſe who are unacquainted with the characters of the men on whom its practice depends; but to thoſe who know them thoroughly, it can be none: for it is certain that very few of them can be prevailed on to alter their uſual methods, though their continuing therein, renders them unable to maintain their families and pay their debts: but what is ſtill more to be lamented, thoſe who are averſe to improvements, diſſuade others alſo from thinking of them. But as the methods commonly uſed, together with the mean price of grain, have every where reduced the farmers ſo low, that they pay their rents very ill, and in many places throw up their farms, the cure of theſe evils is certainly an object worthy of the public attention: for if the proprietors muſt be reduced to cultivate their own lands, which cannot be done by the hands of theſe obſtinate and indocile people, it is eaſy to diſcern on which ſide his balance of profit and loſs will turn. This conſideration, together with many others which might be urged, hath induced us to recommend this treatiſe to the ſerious attention of all who wiſh well to their country; in hopes that ſome may be prevailed on, from a regard either to the public good or their own intereſt, to give the method propoſed in it a fair and impartial trial; for could it be introduced into ſeveral parts of Great Britain, by men of generous and benevolent principles, their example might, in time, eſtabliſh the practice, and bring it into general uſe; which is ſcarce to be expected, by any other means.

It is therefore to ſuch only as are qualified to judge of a theory, from the principles on which it is founded, that we do ourſelves the honour to addreſs them, to give this eſſay an attentive reading, and to try the experiments with proper care. As a motive to this, it is to be obſerved, that, though the method of culture propoſed by Mr. Tull, has made little progreſs in England, it is not likely to meet with the ſame neglect abroad, eſpecially in France, where a tranſlation of his book was undertaken at one and the ſame time, by three different perſons of conſideration, without the privity of each other; but afterwards two of them put their papers into the hands of the third, M. Du Hamel du Monceau, of the Royal Academy of Sciences at Paris, and of the Royal Society of London, who has publiſhed a book, intitled, A treatiſe on Tillage, on the principles of Mr. Tull. The ingenious author has, indeed, in ſome meaſure altered the method obſerved by Mr. Tull, in his book; yet has very exactly given his principles and rules; but as he had only ſeen the firſt edition of the Horſe-hoeing Huſbandry, ſo he is very defective in his deſcriptions of the ploughs and drills, which in that was very imperfect, and was afterwards amended by Mr. Tull, in his additions to that eſſay. One of the principal reaſons for taking notice of this book, is to ſhew the compariſon this author has made between the old method and the new. By his calculation, the profits ariſing from the new are conſiderably more than double thoſe of the old. For, according to him, the profits of twenty acres of land, for ten years, amount, at 10½d. per livre.

	liv.	l.	s.	d.
By the old method to	3000, or	131	5	0
By the new method to	7650, or	334	13	9

Which makes a prodigious difference in favour of the latter. As this computation was made by one who cannot be ſuppoſed to have any prejudice in favour of Mr. Tull's ſcheme, it will naturally find more credit with the public, than any compariſon made by Mr. Tull himſelf, or by thoſe who approve his practice.

There have appeared no objections againſt Mr. Tull's principles or practice, that may not be equally urged againſt every ſort of improvement: one of the principal is, its being impracticable in common fields, without the concurrence of every one who occupies land in the ſame field. But does not this equally affect the old huſbandry? for every ſuch perſon is obliged to keep the turns of plowing, fallowing, *&c.* with the other occupiers; ſo that if any of them were inclinable to improve their lands, by ſowing graſs-ſeed, or any other method of culture, they are under the ſame difficulties as they would be, were they to practice Mr. Tull's method.

Others object, that the introducing this ſort of huſbandry is unneceſſary, ſince the improvements made by graſs-ſeeds are ſo very conſiderable: beſides, the returns made by the fold and dairy being much quicker than by grain, they engage the farmer to mix ploughing and grazing together. But this can have no weight; for it is well known, that in the farms where the greateſt improvements have been made by graſs-ſeeds, the dreſſing required for the arable-land often runs away with moſt of the profit of the whole farm, eſpecially when the price of grain is low. If this be the ſituation of the moſt improved farms, what muſt be the caſe of thoſe which chiefly conſiſt of arable-land, where moſt of the dreſſing muſt be purchaſed at a great price, and often fetched from a conſiderable diſtance. This, together with the great expence in ſervants and horſes, unavoidable in arable farms, ſhew the advantages the grazier has over the ploughing farmer. It is therefore much to be wiſhed, that the practice of mixing the two ſorts of huſbandry, were more generally uſed in every part of the kingdom; and here we apprehend Mr. Tull's method of culture would be the ſureſt way to improve both. For though Mr. Tull chiefly confined the practice of his method to the production of grain, yet it may be extended to every vegetable which is the object of culture in the fields, gardens, and woods; and perhaps may be applied to other crops to equal if not to greater advantage than to corn. In the vineyard it hath been long practiſed with ſucceſs; and it may be uſed in the hop-ground with no leſs advantage. For the culture of beans, peaſe, woad, madder, and other large-growing vegetables, and for lucern, ſaintfoin, and the larger graſſes, we conceive it the moſt profitable method, ſince in all theſe crops, one ſixth part of the ſeed now commonly ſown, will be ſufficient for the ſame quantity of land, and yet the crop will be much greater. It may alſo be uſed with equal advantage in our colonies in America in the culture of ſugar-canes, indigo, cotton, and rice.

It has been objected that it is practicable only on ſuch lands as are ſoft and light, and not at all on ſtiff or ſtony ground: but the hoe-plough has been long uſed in vineyards, where the ſoil is ſtronger and abounds with ſtones full as much as any part of this country; though the uſe of this plough is attended with ſome difficulties upon ſuch land, for wheat, or plants of low growth, whoſe roots may be in danger of being turned out of the ground, or their tops buried by the clods or ſtones; yet none of the larger growing plants are ſubject to theſe inconveniencies. Beſides, the ſtronger the ſoil is, the more benefit it will receive from this method of culture, if the land be thereby more pulverized; which will certainly be the conſequence, where the method laid down by Mr. Tull is duly obſerved.

But as moſt inſtruments, in their firſt uſe, are attended with ſome difficulty, the hoe-plough has been complained of as cumberſome and unweildy both to the horſe and ploughman. But it is proper here to obſerve, that the ſwing-plough, commonly uſed in the land about London, will do the buſineſs of the hoe-plough in all ground that is not very ſtrong or very ſtony; and that where it is ſo, the foot-plough made proportionably ſtrong, will completely anſwer all purpoſes: but then, when theſe are uſed to hoe corn, the board on the left hand of the plough, anſwering the mould-board, muſt be taken off, otherwiſe, ſo much earth will run to the left ſide, as to injure the crop when it is low.

The drills are excellent inſtruments, yet we imagine them capable of farther improvements. Parallel grooves, at about an inch aſunder, round the inſide of the hopper, would ſhew the man who follows the drill, whether or no both boxes vent the ſeed equally. By an hitch from the plank to the harrow, the latter may be lifted to a proper height, ſo as not to be in the way when the ploughman turns at the head-land. Two light handles on the plank, like thoſe of the common plough, would enable the perſon who follows the drill, to keep it from falling off the middle of the ridge: it may be uſeful alſo in wet weather, to double the drill; by which means two ridges may be ſown at the ſame time, the horſe going between them: for the planks of two drills, each plank having one of the ſhafts fixed to it, may be joined end to end by two flat bars of iron, one on each ſide, well ſecured by iron-pins and ſcrews; and by correſponding holes in the planks and bars, the diſtance between the drills may be altered, according to the different ſpaces between the ridges.

We ſhall now annex a computation of the expence and profit both of the old method of culture and the new, experimentally tried by a gentleman of veracity, in a country where the ſoil was light and chalky, that is, of the ſame nature with that from whence Mr. Tull drew his obſervations. In the new huſbandry, every article is put at its full value, and the crop of each year is four buſhels ſhort of the other; though, in ſeveral years experience, it has equalled, and generally exceeded, thoſe in the neighbourhood in the old way.

An Eſtimate of the Expence and Profit of Ten Acres of Land, in Twenty Years.

I. In the Old Way.

The firſt year for wheat coſts 33 l. 5 s. *viz.*	l. s. d.	
Firſt ploughing at 6 s. per acre — — —	3 0 0	
Second and third ditto, at 8 s. per acre, — — —	4 0 0	
Manure, 30 s. per acre, — — —	15 0 0	l. s. d.
		22 0 0
Two harrowings and ſowings, at 2 s. 6 d. per acre, —	1 5 0	
Seed, three buſhels per acre, at 4 s. per buſhel, — —	6 0 0	
Weeding, at 2 s. per acre, — — —	1 0 0	
Reaping, binding, and carrying in, at 6 s. per acre, —	3 0 0	
		11 5 0
Second year for barley coſts 11 l. 6 s. 8 d. *viz.*		33 5 0
Once ploughing, at 6 s. per acre, — — —	3 0 0	
Harrowing and ſowing, at 1 s. 6 d. per acre, — —	0 15 0	
Seed, four buſhels per acre, at 2 s. per buſhel, —	4 0 0	
Weeding, at 1 s. per acre, — — — —	0 10 0	
Cutting, raking, and carrying, at 3 s. 2 d. per acre, —	1 11 8	
Graſs-ſeeds, at 3 s. per acre, — — —	1 10 0	
		11 6 8
Third and fourth years, lying in graſs, coſt nothing.		44 11 8
So that the expence of ten acres in four years comes to 44 l. 11 s. 8 d. and in twenty years to — — — —		222 18 4
Firſt year's produce is half a load of wheat per acre, at 7 l. per acre —		35 0 0
Second year's produce is two quarters of barley per acre, at 1 l. per acre		20 0 0
Third and fourth years graſs is valued at 1 l. 10 s. per acre —		15 0 0
So that the produce of ten acres in four years, is — —		70 0 0
And in twenty years it will be — — — —		350 0 0
Deduct the expence — — — —		222 18 4
And there remains clear profit on ten acres in twenty years by the old way		127 1 8

II. In

II. In the New Way.

	l.	s.	d.	l.	s.	d.
Firſt year's extraordinary expence is						
For ploughing and manuring the land, the ſame as in the old way				22	0	0
Ploughing once more, at 4s. per acre, — —	2	0	0			
Seed, nine gallons per acre, at 4s. per buſhel, —	2	5	0			
Drilling, at 7d. per acre, — — —	0	5	10			
Hand-hoeing and weeding, at 2s. 6d. per acre, —	1	5	0			
Horſe-hoeing, ſix times, at 10s. per acre, — —	5	0	0			
Reaping, binding, and carrying in, at 6s. per acre, —	3	0	0			
The ſtanding annual charge on ten acres is — —	13	15	10			
Therefore the expence on ten acres in twenty years is — —				275	16	8
Add the extraordinaries of the firſt year, and the ſum is —				297	16	8
The yearly produce is at leaſt two quarters of wheat per acre, at 1s. 8d. per quarter, which on ten acres in twenty years amounts to —				560	0	0
Therefore, all things paid, there remains clear profit on ten acres in twenty years, by the new way — — — —				262	3	4

So that the profit on ten acres of land, in twenty years, in the new way, exceeds that in the old way by 135 l. 1 s. 8 d. an ample encouragement to practice a ſcheme, by which ſo great an advantage will ariſe from ſo ſmall a quantity of land in the compaſs of a twenty-one years leaſe. It ought alſo to be obſerved, that Mr. Tull's huſbandry requires no manure at all, though we have here, to prevent objections, allowed the charge of it for the firſt year; and moreover, that though the crop of wheat from the drilling plough is here put only at two quarters on an acre; yet Mr. Tull himſelf, by actual experiment and meaſure, found that the produce of his crop of drilled wheat, amounted to almoſt four quarters on an acre.

HUSBRECE, the ſame with burglary. See the article BURGLARY.

HUSGABLE, antiently ſignified houſe-rent, or ſome tax impoſed upon houſes.

HUSK, the ſame with what botaniſts call the calyx, or cup of a flower. See the article CALYX.

Petiver of the verticellate plants, as ſage, roſemary, and the like, ſays, that it is an erroneous tho' general opinion, that the flowers of theſe plants contain their principal medicinal virtues; the huſks being the part in which this is lodged. Thus, for inſtance, the fine ſcent of hungary-water is not owing to the flowers but huſks of roſemary; ſince the flower alone, when clean picked off them, yields very little odour. See HUNGARY-WATER.

HUSO, the ISINGLASS-FISH, in ichthyology, the ſmooth-bodied accipenſer, a river-fiſh larger than the ſturgeon, or common accipenſer. See ACCIPENSER.

It is ſaid to grow to twenty-four feet in length, and is thick in proportion: the roſtrum or ſnout is long, and furniſhed with cirri; but its mouth is very ſmall in proportion to the ſize of the fiſh, and is furniſhed with no teeth. It has only one ſerrated long fin on the back, a pair of pectoral and another of belly-fins, beſide that near the anus. It is more frequent in the Danube than in any other part of the world. See plate CXXXV. fig. 4.

The ichthyocolla or iſinglaſs of the ſhops, famous as an agglutinant, and for fining of wines, is the produce of this fiſh, made by boiling down its membranous parts to a jelly. See ICHTHYOCOLLA.

HUSSARS, a kind of irregular cavalry, armed with the ſabre and bayonet, are retained in the ſervice of moſt princes on the continent.

They are very reſolute partiſans, and better in an invaſion or haſty expedition, than in a ſet battle.

HUSSITES, the diſciples of John Huſs, a Bohemian, and curate of the chapel of Bethlehem at Prague; who, about the year 1414, embraced and defended the opinion of Wickliff of England, for which he was cited before the council of Conſtance, and, refuſing to renounce his ſuppoſed errors, he was condemned to be burnt alive, which ſentence was accordingly executed upon him at Conſtance.

It is evident in what the pretended hereſy of John Huſs and Jerom of Prague, who ſuffered with him, conſiſted, from the anſwer they made to the council, when they were admoniſhed to conform to the ſentiments of the church: they were lovers, they ſaid, of the holy goſpel, and true diſciples of Chriſt; that the church of Rome, and all other churches of the world, were widely departed from the apoſtolical tradition; that the clergy ran after pleaſures and riches, lorded it over the people, affected the higheſt ſeats at entertainments, bred horſes and dogs, and the revenues of the church, which belonged to the poor members of Chriſt, were conſumed in vanity and wantonneſs; and that the prieſts were ignorant of the commandments of God, or if they did know them, paid but little regard to them. The followers of Huſs were alſo called calixtins, taberites, and bohemian brethren.

HUSTINGS, a court held in Guildhall before the lord-mayor and aldermen of London, and reckoned the ſupreme court of the city. Here deeds may be inrolled, recoveries paſſed, out-lawries ſued out, and replevins and writs of error determined. In this court alſo is the election of aldermen, of the four members of parliament for the city, &c.

This court is very antient, as appears by the laws of Edward the confeſſor.

Some other cities have likewiſe had a court bearing the ſame name, as Wincheſter, York, &c. See the article COURT.

HUSUM, a port-town of Sleſwic or ſouth Jutland, ſituated on the German ſea; ſubject to the duke of Holſtein Gottorp: eaſt long. 8° 30′, north lat. 54° 40′.

HUT, a ſmall cottage; alſo a ſoldier's lodge, otherwiſe called a caſern. See the article CASERNS.

HUTHERFIELD, a market-town in the weſt riding of Yorkſhire: weſt long. 1° 34′, north lat. 53° 37′.

HUXING *of a pike*, a method of catching that fiſh, performed in the following manner: a perſon takes thirty or forty as large bladders as he can get, blows them up, and ties them cloſe together; then at the mouth of each he ties a line, which is longer or ſhorter according to the depth of the water; and at the end of the line is faſtened a baited hook: they are then put into a pond with the advantage of the wind, that they may gently move up and down the water. When a maſter-pike has ſwallowed the hook, and is almoſt ſpent, he is taken out of the water.

HUY, a ſtrong town in the biſhopric of Liege, ſituated on the Maes, ſixteen miles north-eaſt of Namur: eaſt long. 5° 15′, north lat. 50° 35′.

HYACINTH, *hyacinthus*, in botany, a genus of the hexandria-monogynia claſs of plants, the flower of which conſiſts of a ſingle companulated petal, divided into ſix reflex ſegments at the limb: the fruit is a roundiſh capſule, lightly ridged with three corners, and divided into three cells, each of which uſually contains two roundiſh ſeeds.

There is a great variety of theſe beautiful flowers, all of which are propagated by ſeeds, or off-ſets from the old bulbs.

HYACINTH, in natural hiſtory, a genus of pellucid gems, whoſe colour is red with an admixture of yellow.

The hyacinth, tho' leſs ſtriking to the eye than any other red gems, is not without its beauty in the fineſt ſpecimens. It is found of various ſizes, from that of a pin's head to the third of an inch in diameter. Like common cryſtal, it is ſometimes found columnar, and ſometimes in a pebble-form; and is always hardeſt and brighteſt in the larger maſſes.

Its colour is a dull or deadiſh red, with an admixture of yellow in it; and this mixed colour is found in all the variety of tints, that a prevalence of the red or of the yellow in different degrees is capable of giving it.

Our jewellers allow all thoſe gems to be hyacinths or jacinths, that are of a due hardneſs with this mixed colour; and as they are of very different beauty and value in their ſeveral degrees and mixture of colours, they divide them into four kinds; three of which they call hyacinths, but the fourth, very improperly a ruby. 1. When the ſtone is in its moſt perfect ſtate, and of a pure and bright flame-colour, neither the red nor the yellow prevailing, in this ſtate they call it hyacintha la belle. 2. When it has an over-proportion of the red, and that of a duſkier colour than the fine high red in the former, and the yellow that appears in a faint degree in it, is not a fine, bright, and clear, but a duſky browniſh-yellow, then they call it the ſaffron hyacinth. 3. Such ſtones as are of a dead whitiſh-yellow, with a very ſmall proportion of red in them, they call amber-hyacinths. And, 4. When the ſtone is of a fine deep red, blended with a duſky and very deep yellow, they call it a rubacelle. But tho' the over-proportion of a ſtrong red in this gem has made people refer it to the claſs of rubies, its evident mixture of yellow, ſhews that it truly belongs to the hyacinths.

The hyacinth la belle is found both in the Eaſt and Weſt Indies. The oriental are the harder, but the american are often equal to them in colour. The rubacelle is found only in the Eaſt Indies, and is generally brought over among the rubies, but it is of little value: the other varieties are found in Sileſia and Bohemia.

Our druggiſts uſually keep under the names of hyacinths, ſmall garnets, ſome of them of the ſmooth pebble-kind, ſomewhat reſembling the native rubies, and others angular. They have the former from Poland, the latter principally from Bohemia: but neither of them are true hyacinths. They have ſometimes, tho' rarely, the third kind, or amber-hyacinths; and if any ſtreſs were to be laid on the virtues of this ſtone, theſe are the only kind that can lay any claim to it. They have alſo a very ſmall and bad kind of the amber-hyacinth, whiter than thoſe received among the jewellers, which are found in the beds of rivers in Bohemia; theſe, they would perſuade us, are true oriental hyacinths, but beſide our knowing that the ſame are found in Bohemia, the want of hardneſs in the very fineſt of them, is an evident proof of the contrary. The antients have attributed great virtues to this gem; and later writers have even made it the baſis of a cordial and aſtringent confection, which takes its name from it. It is generally ſaid to be cordial, reſtorative, and moderately aſtringent; and ſome have added that it is hypnotic. But the oſtentation of bringing the moſt coſtly things into medicines, rather than any rational opinion of their virtues, ſeems to have given the original hint of introducing the gems into it; and if there were nothing elſe againſt it, one would be cautious of their getting into uſe, were it only from the uncertainty of what apothecaries meet with under their names at the druggiſts.

HYACINTHIA, an antient grecian feſtival, obſerved at Amyclæ in Lanconia, in the month Hecatombæon, in memory of the beautiful young Hyacinthus, ſon of Amyclos king of Sparta. It continued three days, during the firſt of which they ſhewed all imaginable ſigns of grief for the death of Hyacinthus: upon the ſecond and third day, various ſpectacles were exhibited, and hymns ſung in honour of Apollo: they likewiſe offered multitudes of victims, and gave rich entertainment to their friends.

HYADES, in aſtronomy, ſeven ſtars in the bull's head, famous among the poets for the bringing of rain.

The principal of them is in the left eye, called by the Arabs Aldebaran. See the articles TAURUS and ALDEBARAN.

HYÆNA, in zoology, a ſpecies of canis, with the hairs of the neck long and erect. See the article CANIS.

This is a very ſingular and a very ugly animal; it is of the bigneſs of a bull-dog; the head is large and ſhort; the noſe obtuſe; the mouth wide, and furniſhed with a terrible armature of teeth; the eyes are large, black, and of a very fierce aſpect; the ears are ſhort, broad, and erect; the neck is very thick, and covered with a kind of briſtles inſtead of hairs, which naturally ſtand erect, and give a very formidable appearance to the creature; the body is bulky and rounded, and the ſhape not unlike that of a pig; the legs are moderately long, and very robuſt; the general colour is a very duſky-olive, approaching to black; the legs are darker, and the face paler, than the reſt: it is a native of many parts of the eaſt, and is an extremely fierce and voracious animal: it is not very ſwift, but is continually lying in wait for other creatures, and ſcarce any thing that comes in its way eſcapes it: its voice is ſhrill, and has a mournful ſound.

HYALINA, in natural hiſtory, a genus of foſſils, conſiſting of talcs, compoſed of very broad and ſingle flakes, each of conſiderable thickneſs, reſembling plates, of glaſs, and not fiſſile into thinner ones. Of this genus there is only one known ſpecies, *viz.* the brown hyalina, being an extremely pure and very regularly formed body, of a moſt equally laminated ſtructure, and found in maſſes from three to twenty-four inches in diameter; theſe are always flat, very ſmooth, and polite, as if newly ſplit on their horizontal ſurfaces; and very rugged, notched, and chopped on their lateral ones: it ſeldom exceeds four or five inches in thickneſs, even in the largeſt maſſes. See the article TALC.

HYBRIS, in grecian antiquity, a denomination given to a ſilver ſtool placed in the aræopagus, on which the plaintiff or accuſer ſtood; as that on which the defendant or perſon accuſed ſtood, was called anædeia.

Here the plaintiff propoſed three queſtions to the party accuſed, to which poſitive anſwers were to be given. The firſt was, are you guilty of this fact? The ſecond, how did you commit the fact? The third, who were your accomplices?

HYDATIDES, in medicine, little tranſparent veſicles or bladders, full of water, ſometimes found ſolitary, and ſometimes in cluſters, upon the liver, and various other parts, eſpecially in hydropical conſtitutions.

But in a particular ſenſe, the hydatis is a diſeaſe of the eye-lids, called alſo aqula. St. Yves informs us, that there ſometimes comes on the edge of the cartilages of the eye-lids, or on the conjunctiva, an elevation like the bladders which appear on the ſkin after burns. They are as big as a pea, or a lentil; are filled with a very clear liquor, and have the name of hydatides from the lymph which they contain. Sometimes a ſeroſity is extravaſated between the conjunctiva and the membrane which covers it: it ſeparates theſe membranes, and in the movement of the eye, a ſort of wrinkle appears, which ſhews that a ſeroſity ſtagnates between theſe membranes, and produces the ſwelling. This diſeaſe is not at all dangerous; it is a little troubleſome when it ſeizes only part of the conjunctiva. The ſureſt remedy is to prick it dextrouſly with the point of a lancet, and to lay it open according to the longitudinal direction of the tumour, without any other application.

HYDATOIDES, the ſame with the aqueous humour of the eye. See EYE.

HYDATOSCOPIA, called alſo hydromancy, a kind of divination or method of foretelling future events by means of water. See HYDROMANCY.

HYDE, or HIDE. See the article HIDE.

HYDNUM, in botany, a genus of fungi, called by ſome erinaceus: it is an horizontal fungus, echinated, or beſet with ſharp pointed fibres on its under part. See the article FUNGUS.

HYDRA, in aſtronomy, a ſouthern conſtellation imagined to repreſent a water-ſerpent.

The number of ſtars in this conſtellation in Ptolemy's catalogue is 25, and in the britannic catalogue, 68.

HYDRAGOGUES, ὑδραγωγα, among phyſicians, remedies which evacuate a large quantity of water in dropſies. See the article DROPSY.

Quincy obſerves, that the ſtrongeſt cathartics chiefly anſwer to the character of hydragogues, in that by their forcibly ſhaking and vellicating the bowels, and their appendages, they ſqueeze out water enough to make the ſtools appear little elſe. The principal hydragogues, in the common opinion, are the juices of elder, or the root of iris, of ſoldanella, mechoacan, jalap, *&c.* In the general, all ſudorific, aperitive, and diuretic medicines are truly hydragogues.

HYDRANGEA, in botany, a genus of the decandria-digynia claſs of plants; the corolla whereof conſiſts of five equal, roundiſh petals, greater than the cup: the fruit is a roundiſh didymous capſule; the two permanent ſtyles make two beaks to it, and is rendered angular by many ribs: it is coronated by the cup, and divided into two cells by a tranſverſe membrane: the ſeeds are numerous, angular, acuminated, and very ſmall.

HYDRARGYRUM, a name given to mercury or quickſilver. See the article MERCURY.

HYDRAULICS, the ſcience of the motion of fluids, and the conſtruction of all kinds of inſtruments and machines relating thereto.

The laws of the motion of fluids, and the cauſes of their deſcent or riſe below or above the common ſurface or level of the ſource or foundation, have been already delivered under the article fluid: and the art of conducting fluids into pipes, canals, drains, *&c.* as alſo the art of raiſing them, with the ſeveral machines employed for that purpoſe, as ſyphons, pumps, ſyringes, fountains, fire engines, mills, *&c.* are deſcribed under their proper heads. See the articles SYPHON, PUMP, SYRINGE, FOUNTAIN, ENGINE, MILL, *&c.*

Hydroſtatics explain the equilibrium of fluids at reſt; upon removing which equilibrium motion enſues, and hydraulics commence.

Hydraulics, therefore, ſuppoſe hydroſtatics, and the generality of writers, from the immediate relation between the two, join them together, and call them both either hydraulics or hydroſtatics. See the article HYDROSTATICS.

HYDRELÆUM, in pharmacy, a mixture of common oil with water, which, taken internally, is emetic; but applied externally, is anodyne, and promotes ſuppuration.

HYDRENTEROCELE, in ſurgery, a ſpecies of hernia, wherein the inteſtines deſcend into the ſcrotum, together with a quantity of water. See HERNIA.

HYDROCANISTERIUM, an engine which ſpouts water in great quantities, and to conſiderable heights, in order to extinguiſh accidental fires in houſes. See the article ENGINE.

HYDROCELE, in ſurgery, denotes any hernia ariſing from water, but is particularly uſed for ſuch a one of the ſcrotum which ſometimes grows to the ſize of one's head, without pain, but exceeding troubleſome to the patient.

Tho' authors, ſays Sharp, mention ſeveral kinds of this diſeaſe, there are but two; the firſt is when the water is contained in the tunica vaginalis; the ſecond, when it is contained in the cellular membrane of the ſcrotum. This laſt is always complicated with an anaſarca, a kind of dropſy which conſiſts in the extravaſation of the water which lodges in the cells of the membrana adipoſa. The hydrocele in this caſe is eaſily known, for the ſkin is ſhining and ſoft, yielding eaſily to a ſlight impreſſion, which will remain pitted ſome time. The penis is alſo ſometimes prodigiouſly ſwelled by the liquor which inſinuates into the cellular membrane. There are none of theſe ſymptoms in the dropſy of the tunica vaginalis.

In the dropſy of the cellular membrane of the ſcrotum, ſome recommend the punƈture with a trocar; others, to make ſmall apertures here and there with the point of a lancet; others, to put a ſmall ſkane of ſilk through the ſkin with a needle, and to let it remain as a ſeton till all the water is drained off. But the two firſt methods yield very little relief, and the laſt may be more likely to induce a gangrene. Nor is there occaſion for any operation at all, becauſe the cellular membrane of the ſcrotum, is nothing but a continuation of the membrana adipoſa, and therefore ſcarifications made in the ſkin of the ſmall of the legs, will effeƈtually empty the ſcrotum; yet ſometimes there falls ſo great a quantity into the ſcrotum, that the diſtenſion is very painful, threatening a mortification: likewiſe the prepuce is very often ſo exceſſively dilated and twiſted, that it hinders the patient from making water. In theſe caſes, there ſhould be an inciſion made on each ſide of the ſcrotum, three inches in length, quite through the ſkin into the cells which contain the water, and likewiſe two or three half an inch long in any part of the penis with a lancet or knife.

The dropſy of the tunica vaginalis, is cauſed by an exceſſive accumulation of a ſeroſity which is naturally ſeparated in the internal ſurface of that tunic, in a ſmall quantity, to moiſten and lubricate the teſticle.

This diſorder is not often the effeƈt of any accident. It never diminiſhes when once begun, but generally continues to encreaſe, but in ſome perſons not ſo quick as others. It is tenſe and ſmooth, and ceaſes before or when it arrives at the rings of the abdominal veſſels. When the teſticle is encreaſed in ſize, the tumour is rounder, and, if not attended with an enlargement of the ſpermatic veſſels, the cord may be eaſily diſtinguiſhed between the tumour and the abdomen.

As to the cure, the author above-mentioned has found little ſucceſs from inward medicines or outward applications, and therefore thinks it moſt adviſeable to wait till the tumour becomes troubleſome, and then to tap it with a lancet. If the orifice of the ſkin ſlips away from that of the tunic, and prevents the egreſs of the water, you may introduce a probe, and by that means ſecure the exaƈt ſituation of the wound. When the tunica vaginalis is very tenſe, the teſticle itſelf cannot be eaſily diſtinguiſhed; but there will be no danger of wounding it, if the inferior part of the ſcrotum is opened with a lancet not too long. During the evacuation, the ſcrotum muſt be regularly preſſed; and after the operation, a little piece of dry lint and ſticking-plaſter are ſufficient. This is called a palliative cure, but it now and then proves an abſolute one. It is dangerous to attempt a a radical cure by making a large wound, either by inciſion or cauſtic, and therefore that method ſhould be diſcarded.

HYDROCEPHALUS, in ſurgery, a preternatural diſtention of the head, to an uncommon ſize, by a ſtagnation and extravaſation of the lymph, which, when collected within ſide of the bones of the cranium, the hydrocephalus is then termed internal; as it is external, when retained betwixt the common integuments and the cranium.

The firſt kind of the diſorder is ſeldom to be met with but in infants; and if it is advanced to any great degree, is a dangerous caſe, and generally incurable. If the diſorder is in its firſt ſtage, and but beginning to ſhew itſelf, it will be moſt adviſeable, according to Heiſter, to try what may be done by medicines, ſuch as gentle and repeated purges, to draw the humours downwards, with corroborating medicines, internally; while externally there is applied a large compreſs dipt in lime-water and ſpirit of lavender, or hungary water, which compreſs muſt be retained by a proper bandage. See the article BANDAGE.

The external hydrocephalus is diſtinguiſhed by the ſoftneſs of the head and ſkin externally; but in the internal hydrocephalus, the head feels as hard as uſual, and yet it is much more diſtended and inlarged. Though the external hydrocephalus is not without danger, yet it may be much more eaſily cured than the internal, but with the greater difficulty, as it is of a longer ſtanding. According to the ſame author, the cure muſt be attempted as well by internal as external remedies at the ſame time; ſuch as cathartics, diaphoretics, diuretics, attenuating and ſtrengthening medicines for internal uſe: and externally may be applied a compreſs dipped in the fomentation before-mentioned for the internal hydrocephalus. In this caſe the repeated chewing of tobacco in the mouth, to diſcharge the ſeroſities from the head by ſpitting, is adviſeable: ſome foment the head with fumes of burning ſpirit of wine highly rectified, but if all theſe means prove unſucceſsful, recourſe muſt then be had to chirurgical helps, among which you ought firſt to try a bliſter applied behind the ears on the occiput and neck, and if this does not altogether anſwer the intention, you muſt add ſcarification and cupping upon the ſame parts. See the article CUPPING.

HYDROCHARIS, the LITTLE WATER-LILY, in botany, a genus of the diœcia-enneandria claſs of plants, the male flower of which has a ſpatha, and is compoſed of three large, plain, and roundiſh petals; the female flower is like the male one, only without any ſpatha: the fruit is a coriaceous and roundiſh capſule, conſiſting of ſix cells, in which are contained a great number of very ſmall and roundiſh ſeeds.

HYDROCORAX, the WATER-RAVEN, in ornithology, a ſpecies of buceros, with a ſmall head and bluiſh back.

This bird is about the bigneſs of the common raven, and is a native of Tartary and China; from whence its beak is often brought over to us as a curioſity, on account of its ſize, as being ſeven inches in length, and in the largeſt part, about the middle of the gibboſity, near three inches in diameter.

There is alſo another ſpecies, about the bigneſs of our common crow, the head of which is of a deep greeniſh caſt, but with an admixture of black: the body too is of a greeniſh colour.

HYDROCOTYLE, MARSH-PENNY-WORT, in botany, a genus of the pentandria-digynia claſs of plants, the univerſal corolla of which is uniform in figure, though not in ſituation; and the ſingle corollæ are formed of five ovato-acute, patent petals: the fruit is orbicular, erect, and compoſed of two compreſſed and ſemi-orbicular ſeeds.

This plant is common with us in damp places, and is ſuſpected of hurting ſheep that feed on it; whence it is ſometimes called white-rot. See the article ROT.

HYDROGRAPHY, ὑδρογραφια, the art of meaſuring and deſcribing the ſea, rivers, lakes, and canals.

With regard to the ſea, it gives an account of its tides, counter-tides, ſoundings, bays, gulphs, creeks, *&c.* as alſo of the rocks, ſhelves, ſands, ſhallows, promontories, harbours, the diſtance and bearing of one port from another, with every thing that is remarkable, whether out at ſea, or on the coaſt.

HYDROMANCY, a method of divination by water, practiſed by the antients in this manner. They filled a cup or bowl of water: then faſtening a ring to a piece of thread tied to their finger, held it over the water, and repeated a certain form of words, deſiring to be ſatisfied with regard to their enquiry; and if the queſtion was anſwered in the affirmative, the ring would ſtrike the ſides of the bowl of its own accord.

Another kind of hydromancy was to look upon the water in which the figure of ſeveral dæmons uſed to appear. This expedient Numa is ſaid to have made uſe of, to ſettle the ceremonies of religion.

This way of divination is ſaid to have been uſed firſt by the Perſians, and afterwards approved by Pythagoras.

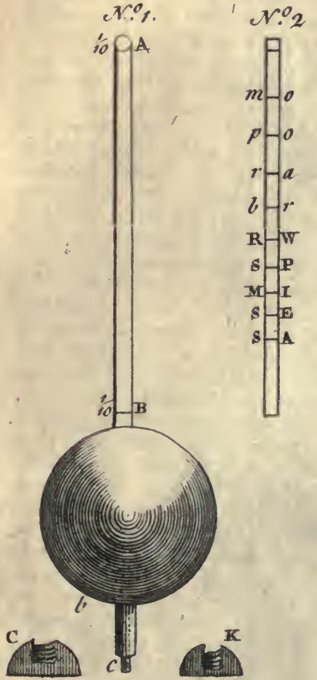
HYDROMEL, among phyſicians, water impregnated with honey, either before or after fermentation.

Vinous hydromel, commonly called mead, is ſaid to be good for the gravel. See the article MEAD.

HYDROMETER, an inſtrument to meaſure the gravity, denſity, velocity, force, *&c.* of water and other fluids. See the articles WATER and FLUID.

The hydrometer is one of the moſt uſeful inſtruments of the philoſophic kind; for tho' the hydroſtatical balance be the moſt general inſtrument for finding the ſpeci-

Fig. 1. HYDROMETERS.



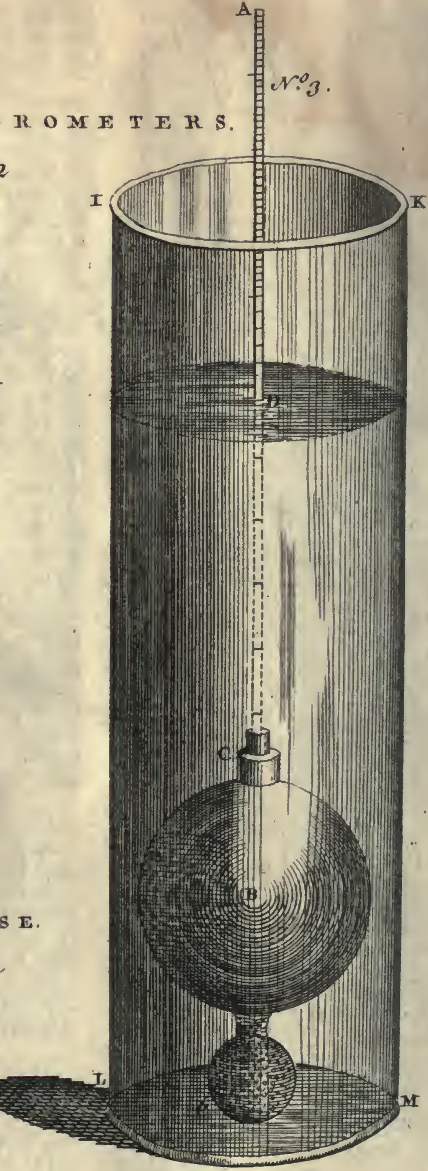


Fig. 2. HYPOTHENUSE.

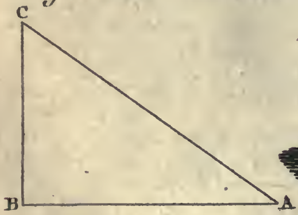
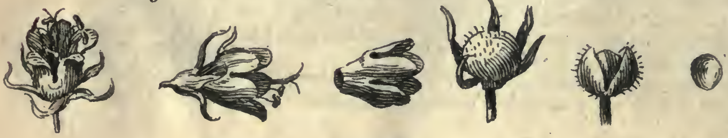


Fig. 3. HYDROPHYLLUM.



J. Jefferys sculp

fic gravities of all ſorts of bodies, yet the hydrometer is beſt ſuited to find thoſe of fluids in particular, both as to eaſe and expedition.

This inſtrument ſhould be made of copper, ſince ivory imbibes ſpirituous liquors, and thereby alters its gravity; and glaſs is apt to break. The moſt ſimple kind, uſed for finding the ſtrength of ſpirits, conſiſts of a copper-ball B *b* (plate CXXXVII. fig. 1. nº 1.) with a braſs-wire, A B, $\frac{1}{4}$ of an inch thick, ſoldered into it. The upper part of this wire being filed flat, on one ſide, is marked proof at *m*, becauſe it ſinks exactly to this mark in proof-ſpirits. There are other two marks at A and B, to ſhew whether the liquor be $\frac{1}{10}$ above or below proof, according as the hydrometer ſinks to A or emerges to B, when a braſs-weight as C or K has been ſcrewed on at the bottom *c*. There are alſo weights to be ſcrewed on, for ſhewing the ſpecific gravities of fluids quite to common water. The round part of the wire above the ball, may be marked ſo as to repreſent river-water when it ſinks to R W, (*ibid.* nº 2.) the weight which fits the inſtrument for river-water being ſcrewed on at *c*: alſo when put into ſpring-water, mineral-water, ſea-water, and water of ſalt-ſprings, it will emerge or riſe gradually to the marks S P, M I, S E, S A; and, on the contrary, when put into Briſtol-water, rain-water, port-wine, and mountain-wine, it will ſucceſſively ſink to the marks *b r*, *r a*, *p o*, *m o*.

Another kind, which ſerves to diſtinguiſh the ſpecific differences of fluids to great nicety, conſiſts of a large hollow ball B, (*ibid.* nº 3.) with a ſmaller ball *b* under it, partly filled with quick-ſilver or ſmall ſhot, and ſcrewed on to the lower part of the former, in order to render it but little ſpecifically lighter than water: it has alſo a ſmall ſhort neck at C, into which is ſcrewed the graduated braſs-wire A C, which by its weight cauſes the body of the inſtrument to deſcend in the fluid, with part of the ſtem.

When this inſtrument is ſwimming in the liquor, contained in the jar I L M K, the part of the fluid diſplaced by it, will be equal in bulk to the part of the inſtrument under water, and equal in weight to that of the whole inſtrument. Suppoſe the weight of the whole were 4000 grains, then it is evident we can by this means compare together the different bulks of 4000 grains of various ſorts of fluids. For if the weight A be ſuch as ſhall cauſe the aræometer to ſink in rain-water, till its ſurface comes to the middle point of the ſtem 20; and if, after this, it be immerſed in common ſpring-water, and the ſurface is obſerved to ſtand $\frac{1}{10}$ of an inch below the middle point 20; it is evident that the ſame weight of each water differs in bulk only by the magnitude of $\frac{1}{10}$ of an inch in the ſtem.

Now ſuppoſe the ſtem were ten inches long, and weighed 100 grains, then every tenth of an inch would be one grain weight; and ſince the ſtem is of braſs, and braſs is about eight times heavier than water, the ſame bulk of water will be equal to $\frac{1}{8}$ of a grain; and conſequently to the $\frac{1}{8}$ of $\frac{1}{4000}$ part, that is, a 32000th part of the whole bulk, which is a degree of exactneſs as great as can be deſired. Yet the inſtrument is capable of ſtill greater exactneſs, by making the ſtem or neck conſiſt of a flat thin ſlip of braſs, inſtead of one that is round or cylindrical: by this means we increaſe the ſurface, which is the moſt requiſite thing; and diminiſh the ſolidity, by which the inſtrument is rendered more exact.

In order to adapt this inſtrument to all ſorts of uſes, there ought to be two different ſtems to ſcrew on and off in a ſmall hole at *a*. One ſtem ſhould be ſuch a nice thin ſlip of braſs, or rather of ſteel, like a watch-ſpring ſet ſtraight, as we have juſt mentioned, on one ſide of which ought to be the ſeveral marks or diviſions, to which it will ſink in various ſorts of waters, as rain-water, river-water, ſpring-water, ſea water, ſalt ſpring-water, &c. And on the other ſide you mark the diviſion to which it ſinks in various lighter fluids, as hot bath-water, Briſtol-water, Lincomb water, Chelten-water, port wine, mountain, madeira, and various other ſorts of wine. But in this caſe the weight A on the top muſt be a little leſs than before, when it was uſed for the heavier waters.

But, in caſe of trying the ſtrength of ſpirituous liquors, a common cylindric ſtem will do beſt, becauſe of its ſtrength and ſteadineſs; and this ought to be ſo contrived that, when immerſed in what is called proof ſpirit, the ſurface of the ſpirit may be upon the middle point 20; which is eaſily done by duly adjuſting the ſmall weight A on the top, and making the ſtem of ſuch a length that, when immerſed in water, it may juſt cover the ball, and riſe to *a*; but, when immerſed in pure ſpirit, it may ariſe to the top at A; then by dividing the upper and lower parts *a* 20, A 20, into ten equal parts each, when the inſtrument is immerſed in any ſort of ſpirituous liquor, it will immediately ſhew how much it is above or below proof.

This proof-ſpirit conſiſts of half water and half alcohol, or pure ſpirit, that is, ſuch as when poured upon gunpowder, and ſet on fire, will burn all away, and permit the powder to take fire, which it will, and flaſh as in the open air. But if the ſpirit be not ſo highly rectified, there will remain ſome phlegm or water, which will make the powder wet, and unfit to take fire. This proof-ſpirit of any kind, weighs ſeven pounds twelve ounces per gallon.

The common method of ſhaking the ſpirits in a vial, and by raiſing a crown of bubbles, to judge by the manner of their riſing or breaking away whether the ſpirit be proof or near it, is very precarious, and capable of great fallacy. There is no way ſo eaſy, quick, certain, and philoſophical, as this by the aræometer, which will demonſtrate infallibly the difference of bulks, and conſequently ſpecific gravities, in equal weights of ſpirits, to the 30, 40, or 50 thouſandth part of the whole, which is a degree of accuracy, beyond which nothing can be deſired.

HYDROMETRY, *υδρομετρια*, a term ſometimes, though rarely, uſed to denote the menſuration of fluids, their gravity, velocity, *&c.* and conſequently comprehending both hydraulics and hydroſtatics. See HYDRAULICS and HYDROSTATICS.

HYDROMPHALUS, in medicine and ſurgery, a tumour in the navel, ariſing from a collection of water.

The hydromphalus is diſtinguiſhed from other tumours of the navel by its being very ſoft, and yet not tractable and obedient to the touch, ſo as to diminiſh or enlarge by compreſſing it. See the article EXOMPHALUS.

When viewed, placed between the eye and the light, the hydromphalus is found tranſparent. It is to be diſcuſſed by emollient and reſolutive medicines. It is alſo cured by a puncture made in the middle of the navel.

HYDROMYSTES, a name antiently given to certain officers in the greek church, whoſe buſineſs was to make holy-water, and ſprinkle it on the people. See the article HOLY-WATER.

HYDROPARASTATÆ, a ſect of heretics, the followers of Tatian.

This ſect were called alſo encratitæ, apotactitæ, ſaccophori, ſeveriani, and aquarians.

The hydroparaſtatæ were a branch of the manichees, whoſe diſtinguiſhing tenet was that water ſhould be uſed in the euchariſt inſtead of wine.

HYDROPHANÆ, in natural hiſtory, a genus of ſemi-pellucid gems, compoſed of cryſtal and earth; the latter ingredient being in large proportion, and mixed imperfectly, as in the chalcedony; and giving a general cloudineſs or miſtineſs to the ſtone, but of ſo imperfect and irregular an admixture, as not to be capable of ſo good a poliſh as the chalcedony; and appearing of a duſky and foul ſurface, till thrown into water, in which they become lucid, and in ſome degree tranſparent, either in part or totally; alſo changing their colour, which returns to them on being taken out of the water.

To this genus belong the oculus beli of authors, or whitiſh-grey hydrophanes, variegated with yellow, and with a black central nucleus; and the oculus mundi, or lapis mutabilis, which is likewiſe a whitiſh-grey kind without veins.

HYDROPHOBIA, *υδροφοβια*, in medicine, an averſion or dread of water; a terrible ſymptom of the rabies canina.

This diſeaſe generally proceeds from the bite of a mad dog, and almoſt always ariſes from the infection communicated by the bite of a mad animal; yet it has been obſerved to ariſe ſpontaneouſly in ſome animals affected with acute diſeaſes; and we have an inſtance in the medical eſſays by Dr. Innes at Edinburgh, of a young man that had this ſymptom attending an inflammation of the ſtomach. Almoſt all kinds of animals may be afflicted with this diſorder, and may infect other animals, and even men, as dogs, cats, wolves, foxes, horſes, aſſes, mules, horned cattle, hogs, monkies, and cocks but it moſt frequently attacks dogs, wolves, and foxes, without any previous contagion.

A hot climate; exceſſive heats and ſudden colds; a long, hot, and dry ſeaſon; feeding much upon putrid, ſtinking, verminous fleſh; want of water; worm generated in the kidneys, guts, brains or noſtrils, are the preceding cauſes o

madneſ

madneſs in theſe animals. When they are going to run mad, they appear dejected, ſhun company, and hide themſelves: they will not bark, but ſeem to mutter or murmur, and are averſe to food and water; they will fly upon ſtrangers, but retain ſome regard for their maſter: their ears and tails hang down, and they walk along as if they were ſleepy. This is the firſt degree of the diſeaſe; and though the bite is then bad, it is not at the worſt. Afterwards, they begin to pant, hang out their tongues, froth at the mouth, and gape; ſometimes they ſeem dull and half aſleep; ſometimes they will run, but not directly forward, and ſoon ceaſe to know their maſters; their eyes are dejected, look watry and duſty; their tongues are of a lead-colour; they fall away ſuddenly, and grow raging mad. A bite at this time is incurable, and the nearer they are to death, with the more dreadful ſymptoms it is attended.

There is ſcarce any poiſon infectious ſo many ways as this, for it takes effect thro' the cloaths, without fetching blood; by the breath of the animal drawn into the lungs; by a touch of the froth, if recent; by handling the wound, or inſtrument which was the death of the animal; or by handling things which have been infected by any of the former means. Again, there is ſcarce any poiſon which produces ſuch terrible effects, and cauſes ſuch a wonderful change in the perſon infected. When it begins to work, it is moſt violent and quick; and yet, as it is ſaid, will lie dormant for twenty years together before it exerts itſelf. This diverſity depends upon the heat of the ſeaſon, the degree of the diſeaſe in the infected animal, and the temperature of the perſon bit; for the bilious are ſooner affected with it, the phlegmatic and hydropic the leaſt: likewiſe ſomething may be attributed to the way of living, diet, and medicines.

A healthy man infected with this contagion, according to Boerhaave, finds the effects of it diſcover themſelves in the following order: there is a pain in the place where he was bit or received the contagion, and then wandering pains in the other parts, chiefly thoſe that are near it; a laſſitude, heavineſs, liſtleſſneſs of the whole body; unquiet troubled ſleep, and terrible dreams, with convulſions and ſubſultus of the tendons; continual inquietude, ſighs, ſadneſs, love of ſolitude: thus ends the firſt degree of the diſeaſe. Afterwards all the ſymptoms encreaſe with a prodigious ſtraitneſs and oppreſſion about the præcordia; a difficult ſighing, reſpiration, horror, a ſhaking and trembling at the ſight of any liquid, pellucid things; a loſs of appetite; an incredible anxiety; trembling and terrible convulſions, almoſt forcing the patient into a rage when any liquid is touched with the lips or tongue; then a vomiting of dark, bilious, viſcid matter, or porraceous bile; an increaſed heat; a fever, continual watching, a priapiſm, a confuſed ſeries of wild and extravagant thoughts: here the ſecond degree of the diſeaſe may be ſaid to terminate. Now all the ſymptoms grow worſe and worſe: the tongue hangs out, and is rough; the voice is hoarſe; ſtrange horrors, ſtarting and wild looks at the ſight of water; a frothing at the mouth; a voluntary inclination to ſpit at the by-ſtanders; alſo to bite them; the patient foams at the mouth, gnaſhes with the teeth, and would do miſchief if not forcibly held. His pulſe and breathing fail; there is a cold ſweat; the higheſt fury: yet during all this time, which is wonderful, the patient continues in his ſenſes, and is afraid of doing harm. On the fourth day from the firſt degree of the diſeaſe, the patient falls into convulſions with great difficulty of breathing, and then dies.

The prevention and cure of this diſeaſe, except in a few inſtances, are very doubtful and uncertain. The preventive cure, according to Boerhaave, conſiſts in making deep ſcarifications, as ſoon as poſſible, after the bite, in the part affected and thoſe adjacent to it, that they may make a conſiderable diſcharge of blood; and then applying large cupping-glaſſes thereon; or it may be burnt pretty deep with an actual cautery. Then it ſhould be made to ſuppurate by ſome corroſive application proper for that purpoſe; and during all that time, it ſhould continually be fomented with a pickle made with vinegar and ſalt: this ſhould be continued for ſix months at leaſt: the garments he had on at the time of the bite ſhould be cautiouſly laid aſide, or deſtroyed. He ſhould likewiſe, with all convenient ſpeed, be dipt in a river, or the ſea, making him believe that he is going to be drowned: this is to be often repeated; for the effect conſiſts in terrifying the mind, and not in the ſalt water, as is commonly ſuppoſed: then he ſhould be often and ſtrongly purged with rhubarb, agaric, and the juice of elder-bark. He ſhould be put into a ſweat every morning faſting, with a mixture of aromatic vinegar, ſea-ſalt, and hot water: his feet and hands ſhould alſo be daily fomented in a warm bath, and he ſhould waſh his head, mouth, and fauces. Let him often drink cold water, and throw it up again, by vomiting; and let his drink be acidulated. His aliment ſhould be moſt light and laxative, and often taken in ſuch a quantity as to vomit it up again. He ſhould likewiſe abſtain from things that are too ſpicy, from wine, from heating things, from violent exerciſes, and from commotions of the mind.

The cure ſhould be attempted when the diſeaſe is in the firſt degree; and, in the beginning of the ſecond, by treating it as highly inflammatory; by letting blood from a large orifice even to a deliquium; by giving clyſters ſoon after with nitrous or moderately ſalt water, thus: take barley water, ten ounces; nitre, two drams; elder vinegar and honey of roſes, each an ounce: make a clyſter. Or take rue-water, ten ounces; ſea-ſalt, two drams; vinegar impregnated with marygold-flowers, ſix drams; common honey, an ounce: make a clyſter.

Theſe may be repeated boldly, and with leſs caution than in other caſes. After this let the patient be blindfolded, and thrown into a pond of cold water; or let cold water be thrown upon him, till the dread of it almoſt ceaſes: then let a large quantity be forced down his throat; let this be his treatment daily, and at night let ſleep be procured.

Hoffman's ſentiments on this head are greatly different from thoſe of Boerhaave. The antients, ſays he, were of opinion, that all poiſons were of a cold nature, becauſe they obſerved that a more free afflux of blood to the external parts was reſtrained by ſpaſms, for which reaſon they preſcribed heating things, and particularly generous wines, as an univerſal antidote: theſe Celſus ſeems to have followed; and informs us, that the practice of old was to put the patient into a bath, and to make him ſweat as long as his ſtrength would permit, at the ſame time keeping the wound open, that the virus might be diſcharged from it; and then to give him plenty of good generous wine; this being done for two or three days, they judged him out of danger. This practice of the antients, Hoffman thinks moſt effectual, and condemns immerſion in cold water, *&c.* as Boerhaave does the practice of adminiſtring acrid, and heating medicines.

This may give ſome light into the nature of the pulvis antilyſſus publiſhed by Dr. Mead, and received into the diſpenſatory of the college, wherein pepper is one of the ingredients. Take of the powder of aſh-coloured liverwort, four drams; and of the powder of black pepper, two drams: this powder mixt together, is to be taken in warm milk in the morning faſting for four mornings together. After this the doctor orders the patient to be put into a cold bath, pond or river, for thirty days ſucceſſively, early in the morning, and before breakfaſt: he is to remain in it with his head above water, no longer than a minute.

Dr. Sault, from his own experience, recommends another method of cure by mercurial frictions upon the cicatrices, and the parts adjoining, for three days ſucceſſively, and then every other day: beſides this, he orders the patient to take a dram and a half of Palmarius's powder. Dr. James is of opinion, that a vomit or two of mercurius emeticus flavus would be proper, the doſe of which is from two to eight grains; not omitting the cinnabarine powder, nor going into the cold bath in the morning for a month.

HYDROPHORIA, in grecian antiquity, a ſolemnity held at Athens and Ægina, in memory of thoſe that periſhed in the deluge.

HYDROPHYLLUM, in botany, a genus of the pentandria-monogynia claſs of plants, the corolla whereof conſiſts of a ſingle campanulated petal, divided into five erect, obtuſe, and emarginated ſegments: the fruit is a globoſe capſule, formed of two valves, and containing only one cell, with a ſingle, roundiſh, and large ſeed. See plate CXXXVII. fig. 3.

HYDROPIC, a dropſical patient; or a perſon ſwelled and bloated with the abundance of water. See DROPSY.

HYDROPOTA, in medicine, a perſon who drinks nothing but water.

It has long been controverted among phyſicians, whether or no the hydropotæ live longer than other perſons.

HYDROPS, in medicine, the ſame with dropſy. See the article DROPSY.

HYDROSCOPE, an inſtrument antiently uſed for the meaſuring of time.

The hydroſcope was a kind of water-clock, conſiſting of a cylindrical tube,

Fig. 1. HYDROSTATICAL BALLANCES

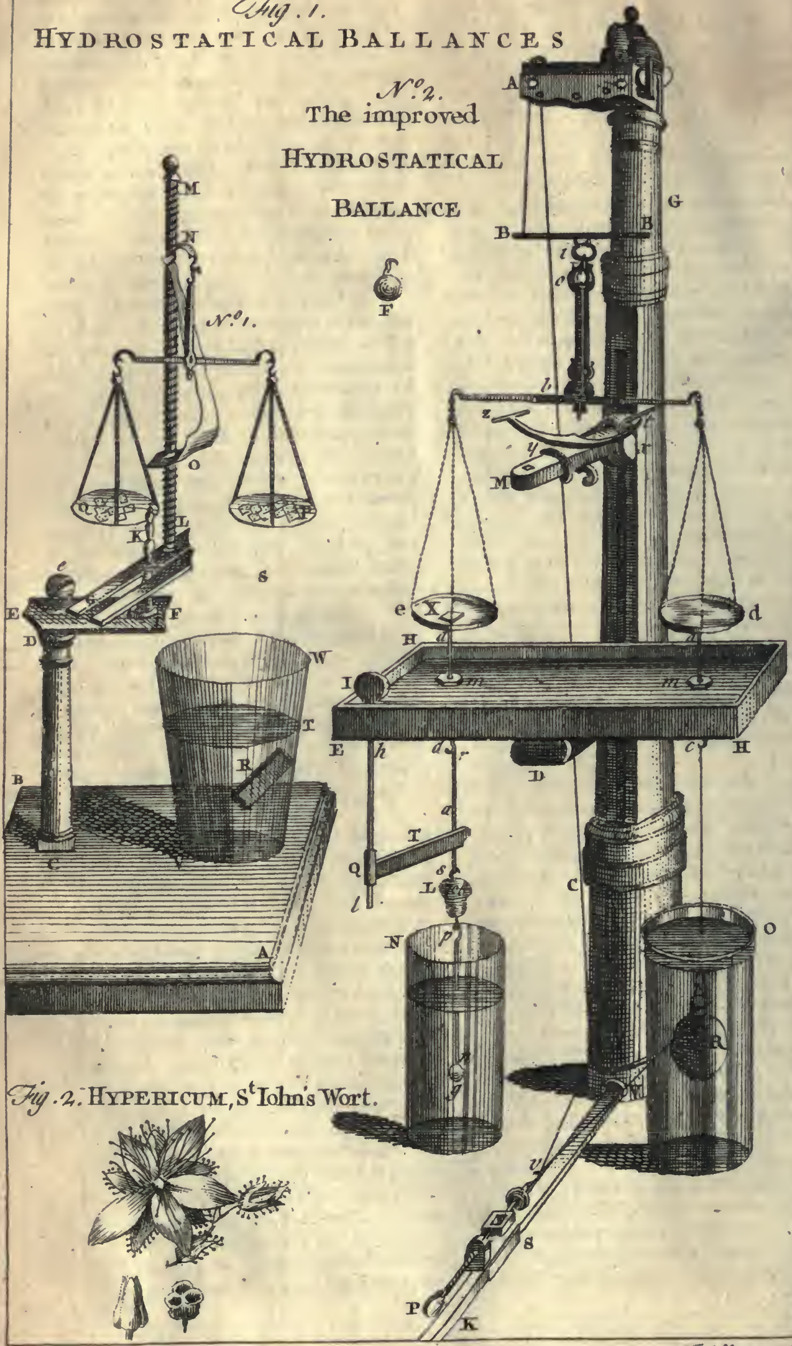


Fig. 2. HYPERICUM, St Iohn's Wort.

T. Jefferys sculp

conical at bottom: the cylinder was graduated, or marked out with diviſions, to which the top of the water becoming ſucceſſively contiguous, as it trickled out at the vertex of the cone, pointed out the hour.

HYDROSTATICAL BALANCE, a kind of balance contrived for the eaſy and exact finding the ſpecific gravities of bodies, both liquid and ſolid.

This inſtrument is of conſiderable uſe in eſtimating the degree of purity of bodies of all kinds; the quality and richneſs of metals, ores, minerals, *&c.* The proportion in any mixture, adulteration, or the like: of all which the ſpecific weight is the only adequate meaſure. The doctrine of the hydroſtatical balance is founded on this theorem of Archimedes, that a body heavier than water, weighs leſs in water than in air, by the weight of as much water as is equal to it in bulk.

We have a new hydroſtatical balance, the parts of which are as follow: AB (plate CXXXVIII. fig. 1. n° 1.) is the foot on which it ſtands; CD is a pillar ſupporting a moveable braſs plate EF, faſtened thereto by the ſcrew in the knob *e*. In the end of this plate is fixed an upright piece IK, ſupporting another plate GH; which ſlides backwards and forwards thereon, and is moveable every way about it. In the end of this plate, at H, is fixed (by a nut beneath) a wire LM, taped with a fine thread from one end to the other; upon this moves the ſwan-neck ſlip of braſs NO, to which a very exact balance is hung at the point N; to one of whoſe ſcales P is appended the heavy body R, by a fine horſe-hair or piece of ſilk S: the weight of the ſaid body R in the air, is expreſſed by the weight put into the ſcale Q to make an equilibrium therewith, which being deſtroyed by immerging the ſolid in the fluid TV, contained in the glaſs WV, is again reſtored by weights put into the ſcale P. So that the weights in the ſcale Q compared with thoſe in the ſcale P, ſhew at once the ſpecific gravity of the ſolid R to that of the fluid TV.

The ſpecific gravity of fluids is readily determined by weighing one and the ſame ſolid body in them ſeverally; for ſince we ſuppoſe the balance in equilibrio with the body ſuſpended in the air, the equilibrium will be deſtroyed when the ſolid is immerſed in the fluid, and muſt be then reſtored by weights put into that ſcale to which the body is appended. Theſe weights will ſeverally expreſs the gravities of an equal bulk of the reſpective fluids; and conſequently they may be thus compared with each other, or all of them with the gravity of common water, as uſual, and diſpoſed in a proper table; making water 1.000. See *Table of ſpecific* GRAVITIES.

In the ſame manner, if divers ſolids are firſt weighed in air, and then afterwards immerſed in the ſame fluid, as water, for inſtance, the equilibrium will be deſtroyed; which will be reſtored, as before, by putting in ſo much weight as is equal to the weight of the ſame bulk of water; the gravity therefore, of every ſolid is thus compared with water, and conſequently with each other.

But in this, and many other caſes, it is required to be very exact in weighing bodies, even beyond what is attainable by the niceſt mechaniſm of this inſtrument. We ſhall therefore give the reader an account of an improvement of the common balance in this reſpect; and it is the more pertinent in this place, as this inſtrument ſerves equally for exactneſs in common as in hydroſtatical matters.

The figure of the machine repreſents the balance in its hydroſtatic uſe, *ibid.* n° 2. We ſhall firſt deſcribe the machine, then ſhew the new contrived artifice for exactneſs; and, laſtly, give an inſtance of its univerſal uſe. VCG is the ſtand or pillar fixed in the table. From the top at A hangs, by two ſilken ſtrings, the horizontal piece or bar BB; from which is ſuſpended, by a ring at *i*, the fine beam of a balance *b*, which is kept from deſcending too low on either ſide by the gentle ſpringing piece *t x y z*, fixed on the ſupporter M. The harneſs is annulated at *o*, to ſhew diſtinctly the perpendicular poſition of the examen, by the ſmall pointed index fixed above it.

The ſtrings by which the balance is ſuſpended paſſing over two pullies, one on each ſide the piece at A, go down to the bottom on the other ſide, and are hung over the hook at *v*; which hook, by means of a ſcrew P, is moveable about $1\frac{1}{4}$ inches backwards and forwards, and therefore the balance may be raiſed or depreſſed ſo much. But if a greater elevation or depreſſion be required, the ſliding piece S, which carries the ſcrew P, is readily moved to any part of the ſquare braſs-rod VK, and fixed by means of a ſcrew.

The motion of the balance being thus provided for, the reſt of the apparatus is as follows: H H is a ſmall table fixed upon a piece D, under the ſcales *d* and *e*, and is moveable up and down in a long ſlit in the pillar above C, and faſtned at any part with a ſcrew behind. At the point in the middle of the bottom of each ſcale is hung by a fine hook a braſs-wire *a d*, *a c*. Theſe paſs through two holes *m*, *m* in the table; and to the wire *a d* is ſuſpended a curious cylindric wire *r s*, perforated at each end for that purpoſe. This wire *r s* is covered with paper graduated by equal diviſions, and is about five inches long.

In the corner of the table at E, is fixed a braſs-tube in which a round wire *b l* is ſo adapted as to move neither too hard nor too freely by its flat head I. Upon the lower part of this moves another tube Q, which has friction enough to cauſe it to remain in any poſition required; to this is fixed an index T, moving horizontally when the wire *b l* is turned about, and therefore may be eaſily ſet to the graduated wire *r s*.

To the lower end of the wire *r s* hangs a weight L, and to that a wire *p n* with a ſmall braſs ball *g*, about ¼ of an inch in diameter. On the other ſide, to the wire *a c*, hangs a large glaſs bubble R by a horſe-hair. Let us at preſent ſuppoſe the weight L taken away, and the wire *p n* ſuſpended from S: and on the other ſide let the bubble R be taken away, and the weight F ſuſpended in its room at *c*. This weight F we ſuppoſe to be ſuch as will keep in equilibrio with the ſeveral parts appended to the other ſcale, at the ſame time that the middle point of the wire *p n* is in the ſurface of the water in the veſſel N. The wire *p n* is to be of ſuch a ſize, that the length of one inch ſhall weigh four grains. Hence it is evident, ſince braſs is eight times heavier than water, that for every inch the wire ſinks in the water, it will become half a grain lighter, and half a grain heavier for every inch it riſes out of the water: conſequently, by ſinking two inches below the middle point, or raiſing two inches above it, the wire will become one grain lighter or heavier. And therefore, if when the middle point is at the ſurface of the water in equilibrio, the index T be ſet to the middle point *a* of the graduated wire *r s*, and the diſtance on each ſide *a r* and *a s* contain a hundred equal parts; then, when in weighing bodies the weight is deſired to the hundredth part of a grain, it may be eaſily had by proceeding in the following manner.

Let the body to be weighed be placed in the ſcale *d*, and put the weight X in the ſcale *e*; and let this be ſo determined, that one grain more ſhall be too much, and one grain leſs too little. Then the ballance being gently moved up or down by the ſcrew P, till the equilibrium be nicely ſhewn at *o*; and then if the index T be at the middle point *a* of the wire *r s*, it ſhews that the weights put into the ſcale *e*, are juſt equal to the weight of the body. By this method we find the abſolute weight of the body; the relative weight is found by weighing it hydroſtatically in water, as follows.

Inſtead of putting the body into the ſcale *e*, as before, let it be appended with the weight F at the hook *c*, by a horſe-hair as at R, ſuppoſing the veſſel of water O were away; then the equilibrium being made, the index T ſtanding between *a* and *r*, at the 36th diviſion, ſhews the weight of the body put in 1095.36 grains. As it thus hangs, let it be immerſed in the water of the veſſel O, and it will become lighter by much; the ſcale *e* will deſcend till the beam of the ballance reſts on the ſupporter *z*. Then ſuppoſe 100 grains put into the ſcale *d* reſtores the equilibrium preciſely, ſo that the index T ſtands at the 36th diviſion above *a*; it is plain the weight of an equal bulk of water would, in this caſe, be exactly 100 grains.

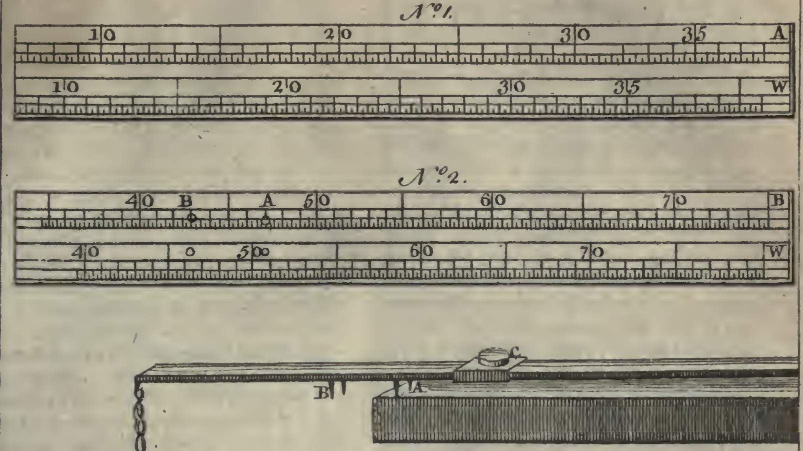
After a like manner may this ballance be applied to find the ſpecific gravities of fluids, which will not be difficult from what has been ſaid.

Bradford's new HYDROSTATICAL INSTRUMENT, a new invention for weighing coin, and diſcovering its defect either of weight or purity.

It conſiſts of a thin, flat, braſs-ruler, about half a foot long; on each ſide of which are two graduated lines, thoſe on the upper ſide being marked A and W (plate CXXXIX. fig. 1. n° 1.) and thoſe on the under ſide B and W, *ibid.* n° 2. There is alſo a ſmall chain and pincers wherein to fix any piece of money intended to be weighed and proved; together with two pair of center-pins, marked A and B, *ibid.* n° 2 and 3, whereof the former pair A are to be uſed for proving all pieces of gold not exceeding the value of 36 s. and the other pair marked B, for all pieces from 36 s. to 72 s. or 3 l. 12 s. Laſtly, there is a ſliding-piece or index C,

(ibid.

Fig. 1. Bradford's HYDROSTATIC INSTRUMENT.



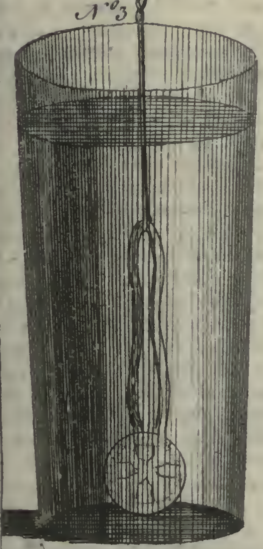


Fig. 2. HYPNUM.

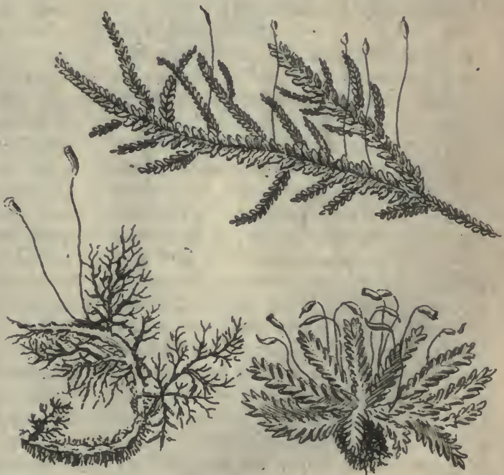
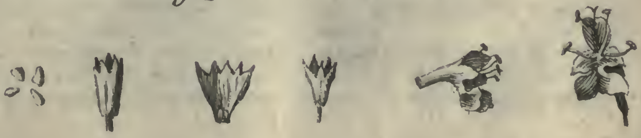


Fig. 3. HYSSOP.



J. Jefferys sculp

(*ibid.* n°. 3.) by the motion of which backwards and forwards upon the ruler, the value of any piece ſuſpended in the pincers is found upon the graduated lines already mentioned; whereof thoſe marked A and B are called ſtatical lines, as being calculated for weighing the piece in air; and thoſe marked W, W, are called hydroſtatical lines, as ſerving to point out the alloy or adulteration of the piece weighed. A whole diviſion on each line, is equal to the weight or value of 1 s. in gold; a half diviſion to 6 d. and a quarter diviſion to 3 d.

To prove a guinea: firſt ſuſpend it in the pincers, and then placing the inſide of the ſliding-piece C to 21 on the line A, on the upper ſide of the ruler, which muſt move freely on the center-pins marked A; and if the guinea and ſliding-piece exactly ballance each other, the guinea is full weight: if not, move the ſlider backward or forward, till they equiponderate, and the diviſion cut by the inſide of the ſlider is the true weight; for inſtance, ſuppoſe it reſts at 20½, then does the guinea weigh only 20 s. 6 d. In the next place, to prove the alloy of this piece, let the ſlider be brought to the diviſion 20½ upon the hydroſtatical line marked W; for whatever diviſion is cut by the ſlider; in weighing on the ſtatical line, it muſt be placed at the ſame on the hydroſtatical line adjoining. Then let the piece, together with the pincers, and the braſs-link whereon it is ſuſpended, be immerſed in water, (*ibid.* n° 3.) as far as the notch in the ſaid link; and if the inſtrument acts in equilibrio, or the piece ſink deeper in the water, the guinea is ſtandard-gold: but if the ſlider muſt be moved farther backward before it will equiponderate, the guinea is adulterated. If alloyed with ſilver, allow 2 s. for every penny it wants in the hydroſtatical weight; and then, if the number of pence the piece is deficient in weight hydroſtatically, when doubled, exceed the number of ſhillings it weighs ſtatically, you may conclude it is adulterated with ſome baſer metal than ſilver. However, a more ſpeedy method of diſcovering whether a piece of gold be adulterated or not, without moving the ſlider more than once, is this: when you have weighed a piece ſtatically, bring the ſlider to the diviſion on the hydroſtatical line expreſſing its weight; and immerſing the piece and pincers as before, ſo that the ſurface of the water may be exactly at the notch or mark on the long link, if the inſtrument doth not then equiponderate, gently lower your hand that holds the fluid till the inſtrument comes to an equilibrium; at which time, if the guinea be a counterfeit, great part of the pincers will appear above water; and if a 36 s. piece be tried, not only the pincers, but a ſmall part of the coin will appear above the ſurface, if the piece be counterfeit. This laſt method is ſufficiently near the truth for common practice.

If you ſhould have occaſion to weigh and prove a very ſmall piece of gold, as 2 s. 3 d. or 4 s. 6 d. the method is to put the ſaid piece in the pincers with ſome other piece that has been proved before; by which means, the weight and alloy of the ſmall piece may be eaſily diſcovered, as above. And if the piece be above 36 s. then the ſlider is to be placed according to the diviſions of the ſtatical and hydroſtatical lines on the under ſide of the inſtrument; which is fitted to the ſtandard of the mint, that makes the guinea to weigh 129 grains.

HYDROSTATICS, that part of philoſophy which treats of the nature, gravity, and preſſure of fluids, all which have been explained and illuſtrated under the article FLUID.

The application of hydroſtatics to the ſeveral uſes of life, will be evident from the following inſtances. Having firſt premiſed that a cubic foot of common water weighs nearly 1000 ounces of averdupois, or 62 pounds and a half, which may be reduced to troy-weight by conſidering that the averdupois pound is to the troy pound as 17 to 14, and the averdupois ounce to the troy ounce, as 51 to 56. Hence to find the quantity of preſſure againſt a ſluice or bank that pens the water, we have this rule: multiply the area of the ſluice under water by the depth of the center of gravity in feet, and the product again by 62½; this laſt product will be the number of pounds required. Example: admit the length of a ſluice to be 20 feet, and the depth of the water 5, then will the area under water be 100 ſquare feet; which multiplied by 2½, the depth of the center of gravity, gives 250 cubic feet; which again multiplied by 62½, gives 15625 ℔. equal to 7 tons nearly.

Again; ſince the weight of bodies is always as the ſpecific gravities in equal bulks, it follows that the numbers in the table of ſpecific gravities, do alſo expreſs the number of averdupois ounces contained in a cubic foot of each reſpective ſort of matter therein mentioned. See the article GRAVITY.

Therefore, if the magnitude of any body be multiplied by the ſpecific gravity, the product will be its abſolute weight.

Another uſeful hydroſtatic problem, is to find the magnitude of any thing when the weight is known; which is done by dividing the weight by the ſpecific gravity, and the quotient is the magnitude ſought. Alſo by knowing the magnitude and weight, we can find the ſpecific gravity by dividing the weight of the magnitude in cubic feet.

Having found by the hydroſtatic ballance the ſpecific gravity of gold to ſilver as 19 to 11, and ſuppoſing any compound thereof, as Hiero's crown, whoſe ſpecific gravity is 16, to determine the proportion and weight of the gold and ſilver employed in making it, ſay, as the difference of the ſpecific gravities of the compound and the lighter ingredient, *viz.* 5, is to the difference of the ſpecific gravities of the heavier ingredient and the compound, *viz.* 3, ſo is the bulk of gold to that of ſilver made uſe of; that is, if the whole crown were divided in 8 parts, the gold would conſiſt of 5, and the ſilver of 3: then the magnitudes 5 and 3 multiplied by the ſpecific gravties 19 and 11, ſeverally, will give the number 95 and 33, which expreſs the proportion of the gold to that of the ſilver. See the article HYDROSTATICAL BALLANCE.

But how great the uſefulneſs and importance of hydroſtatic knowledge is to phyſicians, chymiſts, apothecaries, jewellers, goldſmiths, &c. will appear by reading Mr. Boyle's excellent Medicina Hydroſtatica, in which book the ſkilful author propoſes the following uſes to be made of hydroſtatic knowledge, *viz.*

1. To explore the nature and difference of foſſils, by finding their ſpecific gravities. For ſince the moſt pure and homogeneous kinds of ſtones are in gravity to water as about $2\frac{1}{2}$ to 1, and tin, the lighteſt of metals, is to water in gravity as about 7 to 1, if a ſtony ſubſtance be found to have a greater proportion of gravity than that of $2\frac{1}{2}$ to 1, it muſt be probable that it has in it ſome adventitious matter of a metalline nature; or is at leaſt commixed with ſome mineral body more heavy than pure ſtone, and may therefore very probably be uſefully applied to ſome medicinal purpoſes. As inſtances of this kind, he mentions the lapis hæmatites, lapis lazuli, and lapis calaminaris, all which have their uſes in phyſic.

2. He propoſes this method as very certain to determine whether a body, ſuppoſed to be a ſtone of the mineral kind, be ſo indeed. Thus coral which, ſays he, ſome take to be a plant, and others a lithodendron, but moſt reckon it among precious ſtones, is in gravity to water as 2,68, to 1, which favours the laſt opinion: thus a calculus humanus and a bezoar were found as 1,7 and 1,5 to 1; and therefore too light, to be of the ſame ſpecies with the common ſtone.

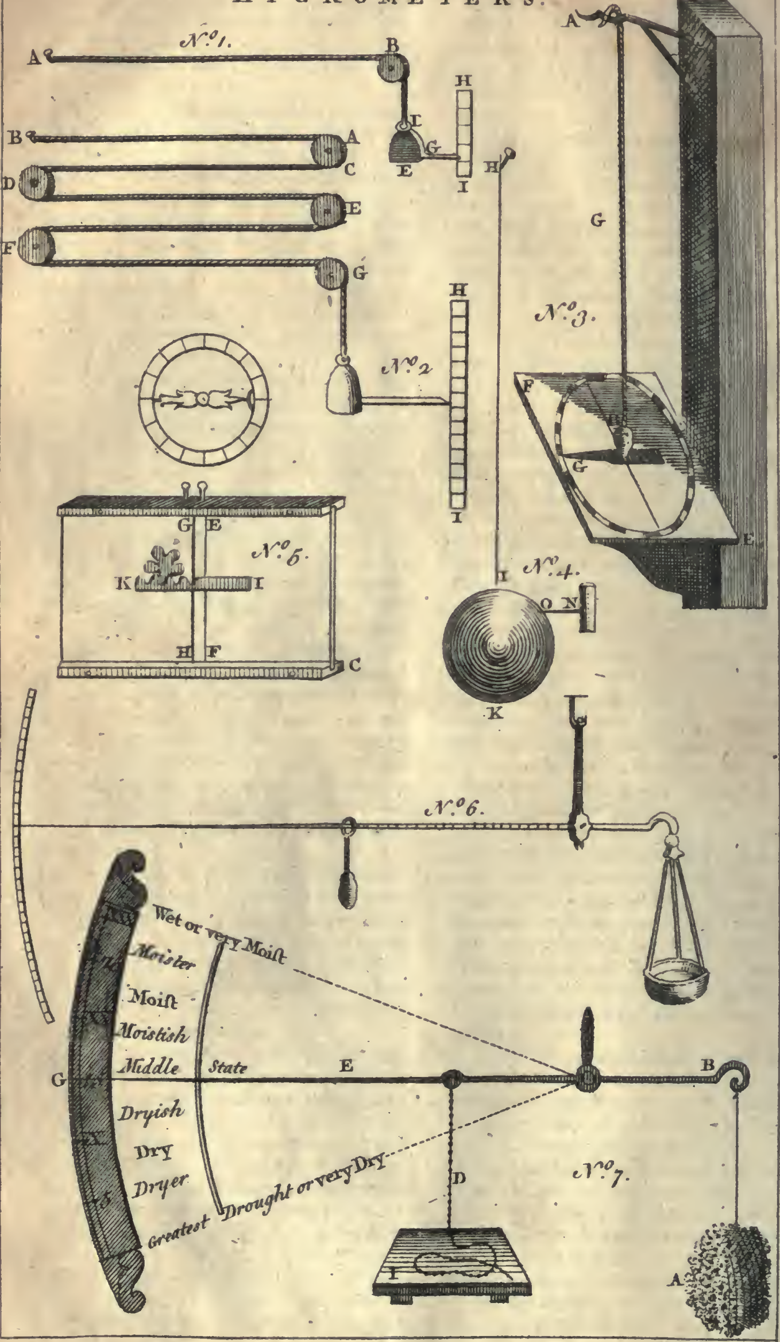
3. A third uſe which he propoſes is to diſcover the reſemblance or difference between bodies of the ſame denomination, and thereby to collect and aſcertain their ſeveral degrees of goodneſs reſpectively. Whence he argues the neceſſity of this ſort of knowledge to phyſicians, chymiſts, apothecaries, druggiſts, to the goldſmith, the merchant, the miner, &c.

4. A fourth uſe is to diſcern genuine ſtones from counterfeit ones, which may be of great help to jewellers: here he gives inſtances of factitious coral, and factitious gems, and a bezoar, which he found out that way not to be genuine, tho' a great price was ſet on the latter.

5. Hence mercury is ſaid to have a different gravity, being ſometimes $13\frac{1}{2}$, and ſometimes above 14 times heavier than water; and hence a notable difference may ariſe in weather glaſſes at the ſame time, and in the ſame place, even to a whole inch, from the different gravity of the mercury in the one and in the other: therefore, thoſe who publiſh regiſters of the weather, ought to find out and declare to the world the ſpecific gravity of the quick-ſilver they uſe in their barometers.

6. Theſe he enumerates over and above what we have taken notice of a mechanichal and geometrical nature, and to let us know the high value he had for this ſcience, he expreſſes himſelf thus: " As little ſkill as I have in hydroſtatics, I would not be debarred from the uſe of them for a conſiderable ſum of money; it having already done me acceptable ſervice, and on far more occaſions than I myſelf at firſt expected, eſpecially in the examen of metals, and mineral bodies, and of ſeveral mineral

HYGROMETERS.



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" mineral productions," with much to the ſame purport.

HYDROTICS, among phyſicians, ſignify medicines more uſually called ſudorifics. See the article SUDORIFIC.

HYGIEINE, from ὑγίεια, health, that part of medicine which preſcribes rules for the preſervation of health; which depends, in a great meaſure, on the prudent uſe of the non-naturals, air, diet, exerciſe, ſleep, paſſions of the mind, retentions and excretions. See the article AIR, DIET, EXERCISE, *&c.*

HYGROMETER, a machine, or inſtrument whereby to meaſure the degrees of dryneſs, or moiſture of the air, or rather of the atmoſphere. See the articles AIR, and ATMOSPHERE.

There are divers ſorts of hygrometers; for whatever body either ſwells or ſhrinks, by dryneſs or moiſture, is capable of being formed into an hygrometer. Such are woods of moſt kinds, particularly aſh, deal, poplar, *&c.* Such alſo is catgut, the beard of a wild oat, *&c.* Stretch an hempen cord or lute-ſtring, as A B. (plate CXL. n° 1.) along a wall, bringing it over a pulley, B; and to the other end D, fix a weight E; into which fit an index G. On the ſame wall fit a plate of metal H I, divided into any number of equal parts, and the hygrometer is compleat. For it is known from experience that moiſture ſenſibly ſhortens the length of cords or fiddle-ſtrings; and that as the moiſture evaporates, they return to their former length. The weight, therefore in the preſent caſe, upon an increaſe of the moiſture of the air, will aſcend; and upon a diminution of the ſame, it will deſcend.

Hence, as the index G will ſhew the ſpaces of aſcent and deſcent; and thoſe ſpaces are equal to the increments and decrements of the length of the cord, or gut, A B D; the inſtrument will diſcover whether the air be more or leſs humid now, then it was at another given time.

But if a more ſenſible and accurate hygrometer be required, ſtrain a whip cord or fiddle-ſtring, over ſeveral pullies B, C, D, E, F, and G. (*ibid.* n° 2.) and proceed as in the former example. Nor does it matter whether the ſeveral parts of the cord A B, B C, C D, *&c.* be parallel to the horizon as expreſſed in the figure or perpendicular to the ſame.

The advantage of this above the former hygrometer, is, that we have the greater length of cord in the ſame compaſs; and conſequently greater contraction or dilatation.

Another method of conſtruction, which is more ſimple, is thus. Faſten a hempen cord or fiddle-ſtring, A B, (*ibid.* n° 3.) to an iron-hook; and let the other end, B, deſcend upon the middle of a horizontal board, or table, E F; near B, hang a leaden weight or ball of a pound, C, and fit an index C G. Laſtly, from the center B deſcribe a circle, which divide into any number of equal parts. Or, inſtead of the table or board, draw two concentric circles on the ball K from I. (n° 4.) and divide them into any number of equal parts, and fix an index N O, to any proper ſupport N. So that it may almoſt touch the diviſions of the ball. Here the cord or gut twiſting or untwiſting will ſhew the change of moiſture, *&c.* by the ſucceſſive application of the index to the diviſion of the circle.

Or thus: provide two wooden frames, A B and C D, (n° 5.) with grooves therein; and between theſe grooves fit two thin leaves of aſh, A E F C, and G B D H, ſo as they may eaſily ſlide either way. At the extremes of the frames A, B, C, D, confine the leaves with nails, leaving between them the ſpace E G H F, about an inch wide. On I faſten a ſlip of braſs dented, I K; and in L a little dented wheel, upon whoſe axis, on the other ſide of the machine an index is to be put. Laſtly, from the center of the axis, on the ſame ſide, draw a circle, and divide it into any number of equal parts. Now, it is found from experience, that aſhen wood readily imbibes the moiſture of the air, and ſwells therewith; and as that moiſture ſlackens, ſhrinks again; upon any increaſe of the moiſture of the air, the two leaves A F and B H growing turgid, will approach nearer each other: and, again, as the moiſture abates, they will ſhrink, and again recede. Hence, as the diſtance can neither be increaſed or diminiſhed without turning the wheel L, the index will point out the changes in reſpect of humidity, or ſiccity. From this contrivance it was that Mr. Coniers in the Philoſophical Tranſactions made the following obſervations for five or ſix years.

1. That theſe pannels will move by ſhrinking moſt in ſummer, and ſwelling moſt in winter; but will vary from this according to the change, to the then more or leſs heat or cold, moiſture or drought, that the temper or ſeaſon, ſuch

as ſpring or fall, do produce; it being then more apt to ſwell or ſhrink on the ſudden, but not attaining then to the higheſt ſhrinking or ſwelling, as in ſummer and winter it doth. 2. That for the moſt part, eſpecially in the ſpring and ſummer-time, this motion happens only in the day-time; for then generally all night it reſts, and moves very ſeldom. 3. That one kind or manner of this motion happens in dry, fair weather, but ſometimes in the forepart of the forenoon, and ſometimes not until the latter part of the forenoon, and then at that time it relaxes or ſwells the deal for about two or three hours; more, ſeldom; leſs, often; and then all the afternoon after it ſhrinks; nay, ſometimes even when a ſmall rain hath newly fallen, or is then falling. 4. This ſhrinking is gradual very often, or for the moſt part a little after a moiſt time, *viz.* the firſt day after moiſture it ſhrinks a little; the ſecond, more, and ſo yet more, according to the then ſeaſon of the year, and as it is then inclined to moiſture or drought, the alteration of the wind, and the heat or cold at that time. 5. The wind's being in the north, north-eaſt, and eaſt, winter and ſummer, for the moſt part at that time the deal ſhrinks, in the night alſo as well as in the day, but not ſo much; which is a ſign of drying weather, and ſometimes of froſt or cold in winter, heat or ſcorching in ſummer, in a clear day. But on the contrary, the ſouth wind's blowing, or the weſt and ſouth-weſt, the deal always relaxes that day, or is at leaſt at a ſtay, provided this happen in the day-time; for then if in the night, not ſo much; and ſo this will do ſome conſiderable time before rain. 6. By a conſtant obſervation of this inſtrument, you may be able to gueſs at the wind's ſituation without a weather-cock, provided you have by you a common and ſealed thermometer. 7. Alſo you may know the time of the year: for in the ſpring it moves quicker, and more in winter; in ſummer it is more ſhrunk than in the ſpring; in autumn leſs in motion than in ſummer.

It is to be obſerved, that all the hygrometers above deſcribed become by degrees leſs and leſs accurate, and at length undergo no ſenſible alteration at all from the humidity of the air.

The following is much more laſting. Take a nice ballance (*ibid.* n° 6.) and place in it a ſponge, or other body, which eaſily imbibes moiſture; and let it be in equilibrio, with a weight hung at the other end of the beam. Now if the air becomes moſt, the ſponge becoming heavier, will preponderate; if dry, the ſponge will be raiſed up. This ballance may be contrived two ways; by either having the pin in the middle of the beam, with a ſlender tongue a foot and a half long, pointing to the diviſions on an arched plate fitted to it; or, the other extremity of the beam may be made ſo long as to deſcribe a large arch on a board placed for the purpoſe, as is repreſented in the figure.

To prepare the ſponge, it may be neceſſary to waſh it in water; and when dry again, in water or vinegar, wherein ſal armoniac, or ſalt of tartar, has been diſſolved, and let it dry again, then it is fit to be uſed.

In the laſt mentioned hygrometer, Mr. Gould, in the Philoſophical Tranſactions, inſtead of a ſponge, recommends, oil of vitriol, which is found to grow ſenſibly lighter or heavier, in proportion to the leſſer or greater quantity of moiſture it imbibes from the air; ſo that being ſatiated in the moiſteſt weather, it afterwards retains or loſes its acquired weight, as the air proves more or leſs moiſt. The alteration in this liquor is ſo great, that in the ſpace of fifty-ſeven days, it has been known to change its weight from three drachms to nine; and has ſhifted an index or tongue of a ballance thirty degrees. A ſingle grain, after its full increaſe, has varied its equilibrium ſo ſenſibly, that the tongue of a ballance, only an inch and a half long, has deſcribed an arch one third of an inch in compaſs, (which arch would have been almoſt three inches if the tongue had been one foot) even with ſo ſmall a quantity of liquor; conſequently, if more liquor, expanded under a large ſurface, were uſed, a pair of ſcales might afford as nice an hygrometer as any kind yet invented. The ſame author yet ſuggeſts, that oil of ſulphur per campanum, or oil of tartar per deliquium, or the liquor of fixed nitre, might be ſubſtituted in lieu of the oil of vitriol.

But among all the inventions the following ſeems beſt calculated both for diſpatch and accuracy. A (*ibid.* n° 7.) repreſents a thin piece of ſponge, ſo cut as to contain as large a ſuperficies as poſſible. This hangs by a fine thread of ſilk, upon the beam B, and is exactly ballanced from another thread of ſilk at D, ſtrung with the ſmalleſt lead ſhot, at equal diſtances, and ſo adjuſted as to cauſe the index E to point at G, in the middle of the graduated arch F G H when the air is in a middle ſtate between the greateſt moiſture and the greateſt dryneſs. I, ſhews a little table or ſhelf for that part of the ſilk and ſhot which is not ſuſpended to reſt upon.

HYLE, or Hylec, among alchymiſts, denotes their firſt matter, or the original chaos of things.

HYLEG, or Hylech, in aſtrology, ſignifies a planet, or the point in the heavens which at a perſon's nativity, is accounted the ſignificator of life. See the article Nativity.

HYMEN, in anatomy, a membrane, ſometimes of a circular, ſometimes of a ſemilunar figure, and ſometimes of a form different from both. It is always found in young girls, and ſtops a part of the vagina. In theſe it has a ſmall aperture, and a longer in adults who have not converſed with men. After the firſt coitus it is not to be found: it is always deſtroyed by it, and if it has not been injured before, ſome blood always follows the rupture of it.

In the heathen mythology, Hymen was the god of marriage, and new-married women offered ſacrifices to this deity. He was repreſented crowned with ſweet marjoram, and ſometimes with roſes; carrying in one hand a torch, and in the other a flame-coloured veil, to repreſent the bluſhes of a virgin.

HYMENÆA, in botany, a genus of the polygamia trioecia claſs of plants, the flower of which is papilionaceous, and its fruit a large legumen or pod, of an ovato-oblong figure, obtuſe, and unilocular, with numerous oval ſeeds, ſurrounded with fibres and farinaceous matter.

HYMENÆAL, ſomething belonging to marriage, ſo called from hymen. See the articles Hymen and Marriage.

The hymenæal ſong is otherwiſe called epithalamium. See Epithalamium.

HYMENOPTERA, in the hiſtory of inſects, a name given to thoſe inſects, which have four wings, and thoſe all entirely membranaceous. See Insect.

HYMN, a religious ſong. The hymns ſung in the chriſtian church, as diſtinguiſhed from the pſalms, are pieces of poetry compoſed by pious, but not inſpired authors.

The uſe of muſic in religious worſhip has prevailed in all nations from the remoteſt ages. The antient heathens were of opinion, that it appeaſed the anger of the gods, for which reaſon their public devotion was generally attended with a concert of voices and inſtruments.

Muſic has likewiſe been conſecrated to religion, both by the Jews and Chriſtians; and the former made uſe of trumpets, drums and cymbals, joined with the voices of the levites and people: but the muſic of the antient chriſtians was plain and ſolemn, and conſiſted only in ſinging hymns, or pſalms, with joint voices. The priſcillianiſts pretended to ſhew, among their apocryphal writings, the hymn which our bleſſed Lord ſung with his diſciples, after his laſt ſupper. But it is generally ſuppoſed, that they ſung the hymn which the Jews were uſed to ſing after eating the paſſover.

HYOIDES, in anatomy, a bone which adheres to the baſe of the tongue.

In young ſubjects the os hyoides is compoſed of three bones, a baſe, occupying its middle part, and two lateral ones, called its horns. In adults there are often, at the junctures of theſe with the baſe, two other fruſtræ, very ſmall, and thence overlooked by moſt writers: theſe are nearly of the ſhape of a wheat-corn, and may therefore be called oſſa triticea: there are ligaments fixed to theſe, by means of which they adhere to the ſtyloide proceſſes. And, finally, in theſe ligaments themſelves, ſometimes, tho' very rarely, there are found ſome other little bones. Veſalius met with ſix of theſe; and ſome others after him have reckoned eleven bones to the formation of the os hyoides.

The uſe of the os hyoides is to give a firm baſis to the tongue: and therefore ſeveral muſcles of the tongue and larynx, ſerving to the neceſſary motions of both, are inſerted into it.

HYOSCYAMUS, Hen-bane, in botany, a genus of the pentandria-monogynia claſs of plants, the flower of which conſiſts of a ſingle infundibuliform petal, with a ſhort cylindrical tube, and an erecto-patent limb lightly divided into five obtuſe ſegments, one of which is broader than the reſt: the fruit is a capſule of an ovato-obtuſe figure, with a line marked on each ſide; it contains two cells, with numerous ſeeds.

The root of this plant, according to Dale, is an excellent refrigerant and emollient, but is ſaid to occaſion madneſs; for which reaſon it is very rarely uſed internally. Its ſeeds are recommended in an hæmoptyſis, and hæmorrhages;

but thoſe of the white henbane are ſaid to be much milder and ſafer.

HYOSERIS, SWINE'S SUCCORY, in botany, a genus of the ſyngeneſia-polygamia-æqualis claſs of plants; the compound flower of which is uniform, with ten hermaphrodite corollulæ diſpoſed into one or more orbs; the partial one is monopetalous, ligulated, linear, truncated, and quinquedentated; the ſtamina are five capillary, very ſhort filaments; there is no pericarpium beſides the cup; the ſeed is ſingle, oblong, compreſſed, of the length of the cup, coronated with a peculiar calyculum and a ſmall capillary down; the receptacle is naked.

This genus comprehends the taraxaconaſtrum of Vaillant, and the leontodontoides of Micheli.

HYOTHYROIDES, in anatomy, a muſcle of the larynx, which ſerves to raiſe it, and conſtringe the glottis.

HYPÆTHROS, or HYPÆTHRON, in antient architecture, a kind of temple open at the top.

Vitruvius ſays, it was an open building or portico, which had no roof or covering, as the temple of Jupiter Olympius, built by Caſſatius, a roman architect at Athens.

HYPALLAGE, among grammarians, a ſpecies of hyperbaton, conſiſting in a mutual permutation of one caſe for another. Thus, Virgil ſays, *dare claſſibus auſtros*, for *dare claſſes auſtris*; and again, *necdum illis labra admovi*, for *necdum illa labris admovi*.

HYPANTE, or HYPERPANTE, a name given by the Greeks to the feaſt of the preſentation of Jeſus in the temple.

This word, which ſignifies lowly or humble meeting, was given to this feaſt, from the meeting of old Simon and Anna the propheteſs in the temple, when Jeſus was brought thither.

HYPATE, in antient muſic, an appellation given to the loweſt chord of a tetrachord. Thus hypate hypaton, was the loweſt chord of the hypaton tetrachord, and anſwered to our B natural of the loweſt octave of the organ; or to the loweſt *mi* of Guido's ſcale. The hypate meſon was the laſt note of the hypaton, and the firſt of the meſon tetrachord. See the article DIAGRAM.

HYPECOUM, *wild* CUMIN, in botany, a genus of the tetrandria-digynia claſs of plants, the corolla whereof conſiſts of four petals; the two exterior petals are broad, trilobated, and obtuſe, and are placed over-againſt one another; the two interior ones ſtand alternately with the others; they are lightly divided into three ſegments, of which the middle one is hollow, compreſſed and erect: the fruit is a long compreſſed pod, incurvated, and articulated: the ſeeds are of a roundiſh figure, but compreſſed, and are placed ſingly in the articulations of the pod.

This plant is an opiate.

HYPER, ὑπερ, a greek prepoſition, frequently uſed in compoſition, where it denotes exceſs; its literal ſignification being above, or beyond.

HYPERBATON, in grammar, a figurative conſtruction inverting the natural and proper order of words and ſentences. The ſeveral ſpecies of the hyperbaton are the anaſtrophe, the hyſteron-proteron, the hypallage, ſynchyſis, tmeſis, parentheſis, and the hyperbaton, ſtrictly ſo called. See ANASTROPHE, *&c.*

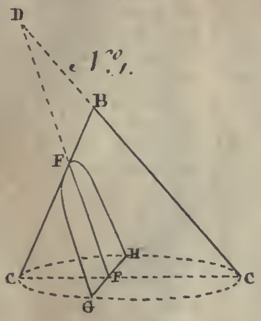
HYPERBATON, ſtrictly ſo called, is a long retention of the verb, which completes the ſentence, as in the following example from Virgil.

Interea reges: *ingenti mole Latinus*
Quadrijugo vehitur curru, cui tempora circum
Aurati bis ſex radii fulgentia cingunt,
Solis avi ſpecimen: bigis it Turnus in albis,
Bina manu lato criſpans haſtilia ferro:
Hinc pater Æneas Romanæ ſtirpis origo,
Sidereo flagrans clypeo & cæleſtibus armis;
Et juxta Aſcanius magnæ ſpes altera Romæ:
Procedunt *caſtris*.

HYPERBOLA, in geometry, the ſection GEH (plate CXLI. n° 1.) of a cone ABC, made by a plane, ſo that the axis, EF, of the ſection inclines to the oppoſite leg of the cone, BC, which in the parabola is parallel to it, and in the ellipſis interſects it. The axis of the hyperbolical ſection will meet alſo with the oppoſite ſide of the cone, when produced above the vertex, at D.

Definitions. 1. If at the point E (*ibid.* n° 2.) in any plane, the end of the rule EH be ſo fixed, that it may be freely carried round, as about a center; and at the other end of the rule H there is fixed the end of a thread ſhorter than the rule, and let the other end of the thread be fixed at the point F in the ſame plane; but the diſtance of the points EF muſt be greater than the exceſs of the rule above the length of the thread; then let the thread be applied to the ſide of the rule EH by the help of a pin G, and be ſtretched along it; afterwards let the

HYPERBOLA.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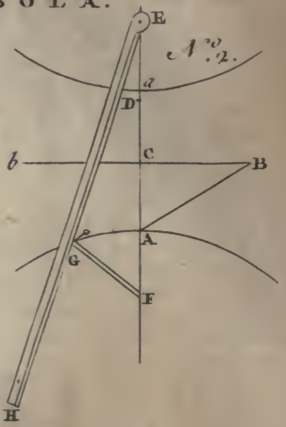
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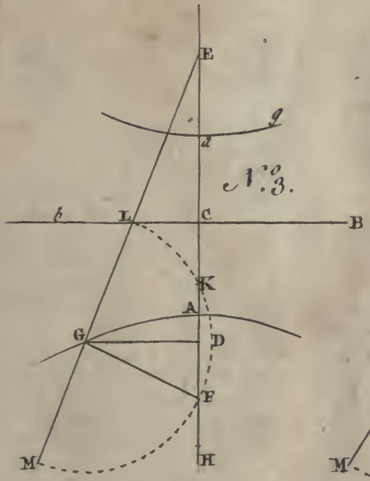
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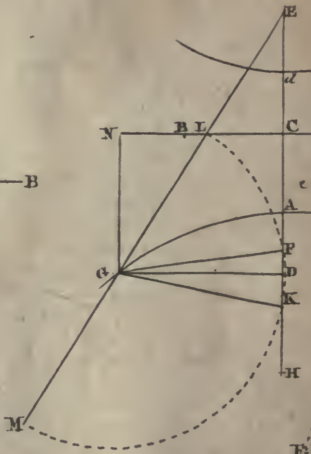
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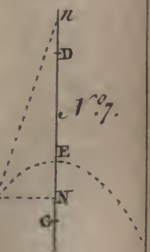
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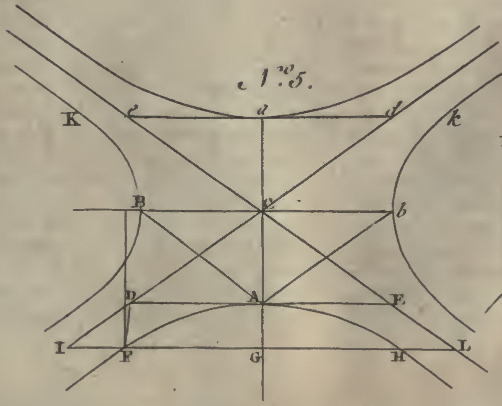
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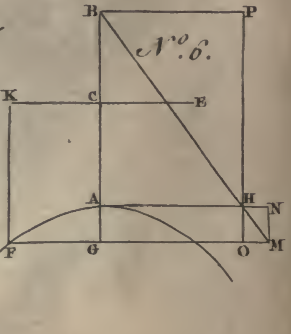
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T. Jefferys sculp.

rule be carried round, and in the mean time let the thread kept ſtretched by the pin be conſtantly applied to the rule: a certain line will be deſcribed by the motion of the pin, which is called the hyperbola. But if the extremity of the ſame rule, which was fixed in the point E, is fixed in the point F, and the end of the thread is fixed in the point E, and the ſame things performed as before; there will be deſcribed another line oppoſite to the former, which is likewiſe called an hyperbola; and both together are called oppoſite hyperbolas. Theſe lines may be extended to any greater diſtance from the points E, F, *viz.* if a thread is taken of a length greater than that diſtance. 2. The points E and F are called the foci. 3. And the point C, which biſſects the right line betwixt the two focus's, is called the center of the hyperbola, or of the oppoſite hyperbolas. 4. Any right line paſſing thro' the center, and meeting the hyperbolas, is called a tranſverſe diameter; and the points in which it meets them, their vertices: but the right line, which paſſes thro' the center, and biſſects any right line terminated by the oppoſite hyperbola's, but not paſſing thro' the center, is called a right diameter. 5. The diameter which paſſes thro' the foci, is called the tranſverſe axis. 6. If from A or *a*, the extremities of the tranſverſe axis, there is put a right line A D equal to the diſtance of the center C from either focus, and with A, as a center, and the diſtance A D, there is a circle deſcribed, meeting the right line, which is drawn thro' the center of the hyperbola at right angles to the tranſverſe axis, in B *b*; the line B*b*, is called the ſecond axis. 7. Two diameters, either of which biſſects all the right lines parallel to the other, and which are terminated both ways by the hyperbola or oppoſite hyperbolas, are called conjugate diameters. 8. Any right line not paſſing thro' the center, but terminated both ways by the hyperbola or oppoſite hyperbolas, and biſſected by a diameter is called an ordinate applied, or ſimply an ordinate to that diameter: the diameter likewiſe, which is parallel to that other right line ordinately applied to the other diameter, is ſaid to be ordinately applied to it. 9. The right line which meets the hyperbola in one point only, but produced both ways falls without the oppoſite hyperbolas, is ſaid to touch it in that point, or is a tangent to it. 10. If thro' the vertex of the tranſverſe axis a right line is drawn equal and parallel to the ſecond axis, and is biſſected by the tranſverſe axis, the right lines drawn thro' the center and the extremities of the parallel line are called aſymptotes. 11. The right line drawn thro' the center of the hyperbola, parallel to the tangent, and equal to the ſegment of the tangent betwixt the aſymptotes, and which is biſſected in the center, is called the ſecond diameter of that which is drawn thro' the point of contact. 12. A third proportional to two diameters, one of which is the tranſverſe, the other ſecond to it, is called the *Latus rectum*, or parameter of that diameter, which is the firſt of the three proportionals. And, 13. Laſtly, n° 5. If upon two right lines A *a*, B *b*, mutually biſſecting each other at right angles, the oppoſite hyperbolas A G, *ag* are deſcribed; and if upon the ſame right lines there are deſcribed two other oppoſite hyperbolas B K, *b k*, of which the tranſverſe axis B *b*, is the ſecond axis of the two firſt; and the ſecond axis of the two laſt, A *a*, is the tranſverſe axis of the two firſt; theſe four are called conjugated hyperbolas, and their aſymptotes ſhall be common.

Prop. I. (*ibid.* n° 2.) The ſquare of the half of the ſecond axis is equal to the rectangle contained by the right lines betwixt the foci and the vertexes of the tranſverſe axis.

Let A *a* be the tranſverſe axis, C the center, E and F the foci, and B *b* the ſecond axis, which is evidently biſſected in the center C, from the definition; let A B be joined: then ſince (by def. 6.) A B and C F are equal; the ſquares of A C and C B together will be equal to the ſquare of C F, that is, (6. 2.) to the ſquare of A C and the rectangle A F *a* together; wherefore taking away the ſquare of A C which is common, the ſquare of C B will be equal to the rectangle A F *a*.

Prop. II. If from any point G (*ibid.* n° 3, 4.) of the hyperbola, a right line G D is drawn at right angles to the tranſverſe axis A *a*, and if from the ſame point there is drawn the right line G F to the focus neareſt to that point; the half of the tranſverſe axis C A will be to the diſtance of the focus from the center, *viz.* C F, as the diſtance of the perpendicular C D, C D, is to the ſum of the half of the tranſverſe axis, and the right line drawn to the focus.

Let G E be drawn to the other focus, and on the axis *a* A produced, let there be ſet off A H equal G F; then with the center G, and the diſtance G F, deſcribe a circle cutting the axis *a* A in K and F, and the right line E G in the points L and M: then ſince E F is double C F, and F K double F D, E K ſhall be alſo double C D; and ſince E L or A *a*, is double C A, and L M double G F or A H, E M ſhall alſo be double C H: but becauſe of the circle E L or A *a* : E F : : E K : E M : and taking their halves, it will be as C A : C F : : C D : C H.

Prop. III. (*ibid.* n° 3, 4.) the ſame things being ſuppoſed, if from A the extremity of the tranſverſe axis neareſt to the point G, there is ſet off a right line A H on the axis produced, equal to the diſtance of the point G from the focus F, neareſt to the ſaid extremity; the ſquare of the perpendicular G D ſhall be equal to the exceſs of the rectangle E H F, contained under the ſegments betwixt H (the extremity of the right line A H) and the foci, above the rectangle A D *a* contained under the ſegments cut off betwixt the perpendicular and the extremities of the axis.

For ſince the right line C H is any how cut in A, the ſquares of C A and C H together will be equal to twice the rectangle A C H, and the ſquare of A H, (7. 2.) *i. e.* becauſe C A, C F, C D, C H are proportionals, to twice the rectangle F C D, and to the ſquare of A H or G F; that is, to twice the rectangle F C D and the ſquares of F D and D G, that is, to the ſquares of F C, C D, and D G, (7. 2.) wherefore the two ſquares of C A and C H are equal to the three ſquares of F C, C D, and D G; and taking away the ſquares of C A and C F from both ſides, the remaining rectangle E H F, will be equal to the remaining rectangle A D *a*, and to the ſquare of D G (6. 2.)

Prop. IV. (*ibid.* n° 3, 4.) If from any point G of the hyperbola, there is drawn a right line parallel to the ſecond axis B *b*, meeting the tranſverſe axis A *a* in D; the ſquare of the tranſverſe axis ſhall be to the ſquare of the ſecond axis, as the rectangle contained under the ſegments of the tranſverſe axis betwixt the parallel and its extremes, to the ſquare of the parallel.

Prop. V. (*ibid.* n° 4.) If from any point G of the hyperbola there is drawn a right line parallel to the tranſverſe axis A *a*, meeting the ſecond axis in N; the ſquare of the ſecond axis, ſhall be to the ſquare of the tranſverſe, as the ſum of the ſquares of the half of the ſecond axis and its ſegment betwixt the center and the right line, to the ſquare of the line itſelf; that is, $CB^2 : CA^2 :: CB^2 + GD^2 : CA^2 +$ the rectangle A D *a*; that is, as $CB^2 + CN^2$ is to CD^2 or GN^2.

Prop. VI. (*ibid.* n° 5.) It is another property of the hyperbola, that the aſymptotes, D *d*, E *e*, do never abſolutely meet with the curve. See ASYMPTOTE.

Prop. VII. If through any point F (*ibid.* n° 5.) of the hyperbola, there is drawn a right line I F L parallel to the ſecond axis, and meeting the aſymptotes in I and L; the rectangle contained under the right lines which are intercepted betwixt the aſymptotes and the hyperbola, is equal to the ſquare of the half of the ſecond axis, that is, $CB^2 = IFL = IHL$.

Prop. VIII. (*ibid.* n° 6.) If from any point F of the hyperbola, there is draw to the tranſverſe diameter, A B, a righ line ordinately applied to it F G; an from the extremity of the diameter ther is drawn A H perpendicular to it, an equal to the *latus rectum*; the ſquare o the ordinate ſhall be equal to the rectangl applied to the *latus rectum*, being of th breadth of the abſciſſa betwixt the ordinate and the vertex, and which exceed it by a figure like and alike ſituated t that which is contained under the diameter and the *latus rectum*.

For join B H, and from the point G le there be drawn G M parallel to A H and meeting B H in M, and through M let there be drawn M N parallel to A meeting A H in N, and let the rectangle M N H O, B A H P, be compleated Then ſince the rectangle A G B, is t the ſquare of G F, as A B is to A H, *i. e.* as G B is to G M, *i. e.* as the rectangl A G B is to the rectangle A G M A G B ſhall be to the ſquare of G F, a the ſame A G B to the rectangle A G M: wherefore the ſquare of G F is equal t the rectangle A G M, which is applied t the *latus rectum* A H, having the breadth A G, and exceeds the rectangle H A G O, by the rectangle M N H O, like t B A H P; from which exceſs the nam

o

of hyperbola was given to this curve by Apollonius.

Prob. I. n° 7. An eaſy method to deſcribe the hyperbola, having the tranſverſe diameter, D E, and the foci N, *n* given. From N, at any diſtance, as N F, ſtrike an arch; and with the ſame opening of the compaſſes with one foot in E the vertex, ſet off E G equal to N F in the axis continued; then with the diſtance G D, and one foot in *n*, the other focus, croſs the former arch in F. So F is a point in the hyperbola: and by this method repeated may be found any other point *f*, further on, and as many more as you pleaſe.

An aſymptote being taken for a diameter; divided into equal parts, and through all the diviſions, which form ſo many abſciſſes continually increaſing equally, ordinates to the curve being drawn parallel to the other aſymptote; the abſciſſes will repreſent an infinite ſeries of natural numbers, and the correſponding hyperbolic, or aſymptotic ſpaces, will repreſent the ſeries of logarithms of the ſame number. See the article LOGARITHM. Hence different hyperbolas will furniſh different ſeries of logarithms; ſo that to determine any particular ſeries of logarithms, choice muſt be made of ſome particular hyperbola. Now the moſt ſimple of all hyperbolas is the equilateral one, *i. e.* that whoſe aſymptotes make a right angle between themſelves.

For the locus of any hyperbola. See the article LOCUS.

For the quadrature of the hyperbola. See the article QUADRATURE.

Ambigenal hyperbola is that which has one of its infinite legs inſcribed, and the other circumſcribed.

Equilateral hyperbola is that wherein the conjugate axes are equal.

Apollonian hyperbola is the common hyperbola, or the hyperbola of the firſt kind: thus called in contradiſtinction to the hyperbolas of the higher kinds, or infinite hyperbolas: for the hyperbola of the firſt kind, or order, has two aſymptotes; that of the ſecond order has three; that of the third, four, &c.

YPERBOLÆON, in antient muſic, the upper or laſt tetrachord or fourth.

It was thus called from its being high or ſhrill, when compared with the other fourths. It was conjoint to another below it, called diezeugmenon.

YPERBOLE, in rhetoric, a figure, whereby the truth and reality of things are exceſſively either enlarged, or diminiſhed. See the article EXAGGERATION

The word is greek, ὑπερβολη, ſuperlatio, formed of the verb ὑπερβαλλειν, *exſuperare*, to exceed, ſurpaſs by far.

The character of an hyperbole is to exaggerate or extenuate the idea of the things ſpoken of, beyond the bounds of truth, or even probability. As, he ran ſwifter than the wind: he went ſlower than a tortoiſe, &c. Hyperboles, ſays Seneca, lie without deceiving; they lead the mind to truth by fictions; they convey the ſentiment intended, tho' by expreſſing it in terms which render it incredible. The hyperbole promiſes too much, in order to make you conceive enough.

Ariſtotle obſerves, that hyperboles are the favourite figures of young authors, who love exceſs and exaggeration; but that philoſophers ſhould not uſe them without a great deal of reſerve. The pitch to which an hyperbole may be carried, is a point of great delicacy. To carry it too far, is to deſtroy it: it is of the nature of a bowſtring, which by immoderate tenſion, ſlackens; and frequently has an effect quite contrary to that intended.

Thoſe hyperboles are beſt, which are latent, and are not taken for hyperboles. For this reaſon they ſhould ſcarce ever be uſed but in a paſſion, and in the middle of ſome important incident: ſuch is the hyperbole of Herodotus, ſpeaking of the Lacedæmonians, who fought at Thermopylæ: "They defended themſelves for ſome time with the arms that were left them, and at laſt with their hands and teeth; till the Barbarians, continually ſhooting, buried them as it were, with their arrows."

Now what likelihood is there, that naked men ſhould defend themſelves with their hands and teeth againſt armed men; and that ſo many perſons ſhould be buried under their enemies arrows? Yet does there appear ſome probability in the thing, by reaſon it is not ſought for the ſake of the figure, but the hyperbole ſeems to ariſe out of the ſubject itſelf. Of the like kind is that paſſage in a comic poet mentioned by Longinus; "He had lands in the country no larger than a Lacedæmonian epiſtle."

HYPERBOLIC, or HYPERBOLICAL,

ſomething relating either to an hyperbole, or an hyperbola. See the article HYPERBOLE and HYPERBOLA.

Thus we ſay, an hyperbolic expreſſion; an hyperbolic image, *&c.*

HYPERBOLIC CONOID. See the article CONOID.

HYPERBOLIC CYLINDROID, is a ſolid figure, woſe generation is given by Sir Chriſtopher Wren, in the Philoſophical Tranſactions. Thus, two oppoſite hyperbolas being joined by the tranſverſe axis, and through the center a right line being drawn at right angles to that axis; and about that, as an axis, the hyperbolas being ſuppoſed to revolve; by ſuch revolution, a body will be generated, which is called the hyperbolic cylindroid, whoſe baſes, and all ſections parallel to them, will be circles. In a ſubſequent tranſaction, the ſame author applies it to the grinding of hyperbolical glaſſes: affirming, that they muſt be formed this way or not at all.

Hyperbolic leg of a curve, is that which approaches infinitely near to ſome aſymptote.

Sir Iſaac Newton, reduces all curves, both of the firſt and higher kinds, into thoſe with hyperbolic legs, and thoſe with parobolic ones. See the article CURVE.

HYPERBOLIC LINE is uſed by ſome authors for what we call the hyperbola itſelf. In this ſenſe, the plane ſurface, terminated by the curve line, is called the hyperbola, or hyperbolic ſpace; and the curve line that terminates it the hyperbolic line.

HYPERBOLIC MIRROUR. See MIRROUR.

HYPERBOLIC SOLID. See the article CUBATURE.

HYPERBOLIFORM FIGURES, are ſuch curves as approach, in their properties, to the nature of the hyperbola; called alſo hyperboloides.

HYPERBOLOIDES, are hyperbolas of the higher kind, whoſe nature is expreſſed by this equation: $ay^{m \times n} = bx^{m}(a+x^{n})$: eſpecially if $m \urcorner 1$, or $n \urcorner 1$, *e. g.* $ay^3 = lx^2(a+x)$.

HYPERCATALECTIC, in the greek and latin poetry, is applied to a verſe, which has one or two ſyllables too much, or beyond the regular and juſt meaſure: as,

> *Muſæ ſorores ſunt Minervæ.* Alſo,
> *Muſæ ſorores Palladis lugent.*

The greek and latin verſes are diſtinguiſhed, with reſpect to their meaſure, into four kinds, acatalectic, catalectic, brachycatalectic, and hypercatalectic.

The hypercatalectic is alſo called the hyperpreter.

HYPERDULIA, in the church of Rome, a ſpecies of worſhip paid to the holy virgin; being greater than the dulia, or worſhip paid to the ſaints, but leſs than the latria or ſupreme worſhip paid to the deity. See the article ADORATION and WORSHIP.

HYPERICUM, *St.* JOHN'S WORT, a genus of the polyadelphia polyandria claſs of plants, the flower of which conſiſts of five oblong, obtuſe, patent petals: the fruit is a roundiſh capſule, with two, three or five cells, containing a great number of oblong ſmall ſeeds. See pl. CXXXVIII. fig. 2.

This genus comprehends the androſæmum and aſcyrum of Tournefort.

St. John's wort is recommended as a vulnerary, detergent, and diuretic: it reſolves coagulated blood, deſtroys worms, and promotes the menſes and urine.

HYPERMETER, in the antient poetry the ſame with hypercatalectic. See the article HYPERCATALECTIC.

HYPERSARCOSIS, in medicine and ſurgery, an exceſs of fleſh, or rather a fleſhy excreſcence, ſuch as thoſe generally ariſing upon the lips of wounds, *&c.* See WOUND and EXCRESCENCE.

HYPERTHYRON, in the antient architecture, a ſort of table uſed after the manner of a frieze, over the jaumbs of doric doors and gates, and the lentils of windows. It lies immediately under the corona, and our workmen uſually call it the king-piece.

HYPHEN, an accent, or character, in grammar, implying that two words are to be joined, or connected into one compound word, and marked thus -, as pre-eſtabliſhed, five-leaved, *&c.*

Hyphens alſo ſerve to connect the ſyllables of ſuch words as are divided by the end of the line.

HYPNOTIC, in the materia medica, ſuch medicines as any way produce ſleep, whether called narcotics, hypnotics, opiates, or ſoporifics.

Authors are of various opinions in regard to the manner wherein hypnotics operate. See the article NARCOTICS.

HYPNUM, in botany, a genus of moſſes of the cryptogamia claſs of plants, conſiſting of ſtalks and leaves, and producing membranaceous capſules; theſe capſules ſtand on pedicles, which grow on the alæ of the leaves, and have at their baſe a kind of ſquamous covering, formed of a matter quite different from the leaves of the plant: the capſules of the hypnum have all their calyptræ; they are of different ſhapes, but uſually long; likewiſe the ſquamous involucrum at the baſe of the pedicle is called by Dillenius perichætium, and is the greater characteriſtic of the hypna, no moſſes of any other genus having it in this form. See plate CXXXIX. fig. 2.

HYPOCAUSTUM, among the Greeks and Romans, a ſubterraneous place, wherein was a furnace, to heat the baths. See the article Bath.

Another ſort of hypocauſtum was a kind of kiln, to heat their winter-parlours.

Among the moderns, it is that place where the fire is kept, that warms a ſtove or hot-houſe.

HYPOCHOERIS, in botany, a genus of the ſyngeneſia-polygamia æqualis claſs of plants, the compound flower of which is imbricated, uniform, and conſiſts of numerous hermaphrodite ſmall flowers, that are all equal; the partial flower is monopetalous, ligulated, linear, truncated, and divided into five ſegments; there is no pericarpium; the cup is connivent and globoſo-accuminated; the ſeed is ſingle, oblong, and ending in a ſubulated pedicle, covered with down.

HYPOCHONDRIA, in anatomy, that part of the body on both ſides, which lies under the ſpurious ribs, and is extended to the ilia; comprehending not only the muſcles, but the internal viſcera.

HYPOCHONDRIAC Passion, a ſpaſmodico-flatulent affection of the ſtomach and inteſtines, ariſing from a preternatural conſtitution of the periſtaltic motion, cauſed by the ſtagnation of the blood and vital fluids between the nervous and muſculous coats of the inteſtines.

This diſeaſe is attended with ſuch a train of ſymptoms, that it is a difficult taſk to enumerate them all; for there is no part of the body that is not, ſooner or later, a ſufferer by its tyranny. It begins with tenſions and windy inflations of the ſtomach and inteſtines, an uncertain appetite, ſometimes quite decayed, and ſometimes ſtrong; the aliments are ill digeſted, breeding acid and viſcid crudities; there is a preſſing heavy pain in the ſtomach, chiefly after meals; a violent heart burn, very acid belchings and vomiting, bringing up ſuch acid ſtuff that the teeth are not only ſet on edge, but the very linen or ſheets ſometimes corroded. In the inteſtines, about the navel, there are felt heavy excruciating pains; in the groſs inteſtines the pains are more acute. Sometimes there is a looſeneſs; ſometimes a moſt obſtinate coſtiveneſs, with a retention of the wind; which when it breaks out, either upwards or downwards, is attended with an alleviation of the ſymptoms; but they ſoon rage again, with as great a violence as ever. The urine is generally thin, limpid, and pale; but ſometimes it has a copious ſediment mixed with ſabulous concretions, and often apes a fit of the gravel. In the breaſt there is a great ſtraitneſs, a difficulty of breathing, and a fluttering and palpitation of the heart. As the diſeaſe increaſes, the patient is troubled with the head-ach, a noiſe in the ears, with difficulty of hearing; the eyes are clouded, ſome have double viſion, or a pain and dryneſs of the eyes, and in the tongue a moſt troubleſome burning pain, fixed to a certain ſpace, with a plentiful excretion of ſpittle. At length the animal functions are impaired, the mind is diſturbed on the moſt trivial occaſions, and is hurried into the moſt perverſe commotions; the patient entertains wild and extravagant fancies, the memory grows weak, and the reaſon fails. Some ſymptoms affect the whole body, which is covered with blotches, or copious ſweats; the ſtrength decays, the limbs are languid and unapt for labour; the body becomes tabid, the joints are tormented ſometimes with a blunt, and ſometimes with a cutting pain; at laſt, all the ſecretions, eſpecially the ſanguineous, are perverted. In ſhort, as Dr. Sydenham obſerves, it imitates all kinds of diſtempers ſo exactly, as to require the utmoſt ſagacity of a phyſician, to diſtinguiſh it from an eſſential diſeaſe of any part.

The remote cauſes of this diſorder are an hereditary diſpoſition to it, a ſedentary ſtudious life, ſadneſs, cares, trouble of mind, intenſe thinking on a ſingle ſubject, a cold and moiſt conſtitution of the air; groſs, impure, flatulent diet; tedious diſeaſes, not rightly treated; the ſuppreſſion of the hæmorrhoids and menſes, and other periodical fluxes of the blood; hard labour in child-bearing, &c. Though hypochondriacs are never perfectly well, yet they are generally worſt in the autumnal and winter ſeaſons. Women generally ſuffer moſt about the time when their menſes ought to flow. And it is worthy of obſervation, that thoſe affected with this diſeaſe, are ſeldom attacked with continual epidemic, or contageous fevers, not even with the plague itſelf.

As to the prognoſtics, if the diſeaſe be recent, and left to itſelf, it is not dangerous; but if it be inveterate, and not ſkilſully treated, or a bad regimen is followed, it is attended with more grievous ſymptoms, and produces obſtructions, and ſchirra of the viſcera, a cachexy, a dropſy, an hectic, a convulſive aſthma, an incurable melancholy or madneſs, &c. But if it be cauſed by a ſuppreſſion of the menſes, or bleeding piles, the diſeaſe will be cured by reſtoring the flux.

As continual fear and diffidence are ſymptoms of this diſeaſe, the patients are always foreboding terrible things, and live in conſtant dread, which renders them fickle, impatient, and prone to run from one phyſician to another; therefore, when a cure is attempted, they muſt be encouraged and perſuaded to be patient, and then the following indications may be purſued: 1. To correct and evacuate the acid, viſcid, bilious filth, and flatulent ſordes from the primæ viæ, which yield continual fuel to this diſeaſe. 2. The ſpaſms being appeaſed, to reſtore the natural order of the periſtaltic motion of the inteſtines, and to recover it from a languid ſtate, that there may be a due concoction of the aliment, a laudable chyle and other fluids generated. 3. To diſperſe the ſtagnated juices, in order to render the circulation of the blood equable through the abdomen and the reſt of the body; and to free the fluids from all acrimony, after facilitating the excretions by urine, and through the ſkin. 4. And, laſtly, to corroborate the whole nervous ſyſtem.

To anſwer the firſt intention, nothing is better in the fit than clyſters made with emollient herbs, water-gruel, ſtrained, camomile flowers, the tops of yarrow; the oils of ſweet almonds, dill, camomile, linſeed, &c. adding a carminative ſpecies made of carraway, dill, but more eſpecially cumin-ſeeds. Theſe ſhould be repeated if the ſpaſms render them ineffectual. Nor muſt gentle laxatives of manna, rhubarb, and cream of tartar be neglected. If there be a great deal of acid filth in the ſtomach, crab's eyes alone will purge. To correct the ſordes in the primæ viæ, give the abſorbent, precipitating, and antiſpaſmodic powders, ſuch as crab's eyes, mother of pearl, petrified nitre, prepared amber, cinnabar, tartar vitriolate, with a little caſtor. It will alſo be proper to take a decoction of any of the following things, in bed, to promote a diaphoreſis, *viz.* balm, veronica, betony, daiſy-flowers, camomile-flowers, fennel-ſeeds, &c.

To reſtore the digeſtive power of the ſtomach, give eſſence of orange-peel, tincture of tartar, dulcified ſpirit of nitre, &c. The paroxyſms are relieved by a tepid pediluvia, made of wheat-bran, water and camomile-flowers, in which the feet ſhould be put pretty deep.

Out of the fit, to diſcuſs the ſtagnation of the blood, bleeding in the foot will be neceſſary, eſpecially at the equinoxes, and at other times, as occaſion ſhall require; but this ſhould be after laxatives and pedeluvia. If there be a diſpoſition to an hæmorrhoidal flux, leeches ſhould be applied every month; and the patient ſhould alſo take balſamic pills, with antiſpaſmodic nitrous powders.

To ſtrengthen the nervous ſyſtem, nothing is better than chalybeates; for they by a gentle aſtriction, reſtore the nerves to their former ſtrength. Outwardly, a ſaponaceous plaſter, with camphire, may be laid to the hypochondria, with no ſmall advantage.

In a thin bilious habit of body, a milk-diet is good, if the firſt difficulty can be got over, *viz.* its coagulating in the ſtomach; otherwiſe it will not be ſufficient to ſuſtain the body in due ſtrength. But nothing is more friendly, nor gives greater energy to the blood and ſpirits, than moderate exerciſe, and particularly riding on horſeback almoſt every day, and for a conſiderable time together: nor does riding in a coach want its ſalutary effects.

HYPOCYSTIS, in pharmacy, an inſpiſſated juice, obtained from the ſeſſile aſarum, much reſembling the true egyptian acacia. See the article ASARUM.

They gather the fruit, while unripe, and expreſs the juice, which they evaporate over a very gentle fire, to the conſiſtence of an extract, and then form into cakes, and expoſe them to the ſun to dry.

Hypocyſt is an aſtringent, and that of conſiderable power; it is good againſt diarrhœas and hæmorrhages of all kinds, and may be uſed in repellent gargariſms in the manner of the acacia; but it is very rarely met with genuine in our ſhops, the german acacia being uſually ſold under its name.

HYPOGASTRIC, an appellation given to the internal branch of the iliac artery. See the articles ARTERY and ILIAC.

HYPOGASTRIC VEINS ariſe on each ſide from the iliacs, and ſend out branches to the rectum. See the article VEIN.

HYPOGASTRIUM, in anatomy, the lower part of the abdomen. See the article ABDOMEN.

HYPOPYON, in medicine, a collection of purulent matter under the cornea of the eye. See the article EYE.

As to the cure of an hypopyon, it ſhould firſt be attempted by violently ſhaking the patient's head, in a ſupine poſture, and preſſing the eye before, with the fingers, in order to remove, or at leaſt looſen the matter.

But if this proves unſucceſsful, the patient being ſeated as in the couching for a cataract, an inciſion is made with a lancet, through the cornea, below the pupil, and about the ſpace of a line from the white of the eye, and that large enough to diſcharge the matter and aqueous humour; preſſing the eye gently by the fingers, and taking care leſt you wound the uvea: then a compreſs, moiſtened with a proper collyrium, is to be applied every third or fourth hour to the eye. If the matter be too thick to be diſcharged, the needle, which is alſo employed for making ſetons, is to be uſed. The inſtruments ſhould be wrapped up, ſo that only the point be bare. In this caſe, St. Yves adviſes to introduce a ſmall probe, or inject ſome cold water with a ſyringe, and continue this till the whole pus be diſſipated, after which the wound may be healed.

HYPORCHEMA, in the greek poetry, a poem, conſiſting of divers kinds of verſe, and of different lengths; but always full of ſhort, or pyrrhichic feet.

HYPOSTASIS, among divines, ſignifies a perſon, or ſubſtance; chiefly uſed in ſpeaking of the perſons of the Trinity. See the article TRINITY.

HYPOSTASIS, in medicine, denotes the ſediment of urine.

HYPOTHECA, in the civil law, the ſame with mortgage in the common law. See the article MORTGAGE.

HYPOTHENAR, in anatomy, the abductor muſcle of the little finger. See the article ABDUCTOR.

HYPOTHENUSE, in geometry, the longeſt ſide A C (plate CXXXVII. fig. 2.) of a right-angled triangle A B C; or it is that ſide which ſubtends the right angle B. Euclid, lib. I. propoſition XLVII. demonſtrates, that, in every rectilinear right-angled triangle, the ſquare of the hypothenuſe A C (*ibid.*) is equal to the ſquares of both the other ſides A B, C B; or, that $AC^2 = AB^2 + CB^2$. This celebrated problem was diſcovered by Pythagoras, who is ſaid to have ſacrificed a hecatomb to the Muſes, in gratitude for the diſcovery.

HYPOTHESIS, in general, denotes ſomething ſuppoſed to be true, or taken for granted, in order to prove or illuſtrate a point in queſtion.

An hypotheſis is either probable or improbable, according as it accounts rationally or not for any phænomenon: of the former kind we may reckon the copernican ſyſtem and Huygens's hypotheſis concerning the ring of ſaturn; and the ptolemaic ſyſtem may be eſteemed an inſtance of the latter. See the article COPERNICAN, *&c.*

Hypotheſes, however elegant and artful, ought to be firſt proved by repeated obſervations and conſtant experience, before they are received as truths. See the article EXPERIMENTAL PHILOSOPHY.

HYPOTHETICAL PROPOSITIONS. See the article PROPOSITION.

HYPOTRACHELION, in architecture, denotes a little freeze in the tuſcan and doric capitals, between the aſtragal and annulets, called likewiſe colerin, gorgerin, *&c.* By ſome it is applied to the neck of any column, or that part of the capital thereof, below the aſtragal.

HYPOTYPOSIS, in rhetoric, ſignifies a lively deſcription.

HYPOZOMA, in anatomy, a membrane that ſeparates two cavities: ſuch is the diaphragm.

HYPSILOIDES, in anatomy, the ſame with the os hyoides. See the article HYOIDES.

HYRNENOPTERA, in zoology, a claſs of inſects of the order of the tetraptera, with wings merely membranaceous, compoſed of a fine thin ſubſtance, without any remarkable nerves. See the article TETRAPTERA.

HYSSOP, *hyſſopus*, in botany, a genus of the didynamia-gymnoſpermia claſs of plants, the flower of which is monopetalous and ringent, the upper lip being erect, roundiſh, and emarginated, and the lower one divided into three ſhort ſegments, the middle one of which is hollow and cordated; the flower is ſucceeded by four ſmall ſeeds, which are roundiſh and of a brown colour. See plate CXXXIX. fig. 3.

Hyſſop is attenuant and diſcutient, and is recommended in diſorders of the lungs, when they are loaded with a foul and thick matter; it ſtrengthens the ſtomach and aſſiſts digeſtion; and by its acrimony, and power of attenuating the viſcous matter in the lungs, promotes expectoration, and is therefore good in aſthmas: its good effects in the ſtomach are of the ſame kind, depending on its attenuating and abſterging the viſcous phlegm lodged there, which impedes the diſcharge of its proper functions. It is alſo good in diſeaſes of the head.

It is beſt taken in infuſion, in the manner of tea, not made ſo ſtrong as to be diſagreeable to the palate, and often repeated. A ſimple water of it, which retains much of its taſte, ſmell, and virtues, is kept in the ſhops; they uſed alſo to have a ſyrup of it, but that has of late been diſregarded.

Externally, hyſſop is greatly recommended in bruiſes; the blackneſs ſettling under the eyes from blows is carried off very readily by a cataplaſm of the leaves, or only a little bundle of them ſewed up in a linen-rag, and applied to the part: and Ray gives us an account from Mr. Boyle, of a violent contuſion of the thigh, from the kick of a horſe, very happily cured by this herb, boiled as a cataplaſm; he tells us, the violent pain was almoſt inſtantly removed, and the very mark and blackneſs taken off in a few hours.

HYSTERICS, or HYSTERIC PASSION, in medicine, a ſpaſmodico-convulſive affection of the nervous ſyſtem, proceeding from the womb, and cauſed by the retention or corruption of the blood and lymph in its veſſels; and more or leſs infeſting the nervous parts of the whole body, by means of the nerves of the os ſacrum, the loins, and the whole ſpinal marrow.

Hoffman, contrary to the ſentiments of Willis, will not allow the uterus to be a nervous part; for he affirms that the hyſteric paſſion, which is attributed to a vice in the womb, is owing to ſpaſtic, convulſive, and epileptic diſorders, all which ariſe from a fault of the genus nervoſum. But Aſtruc obſerves, that the effects of impreſſions are various, according to the degree of their intenſity; thus, tickling the noſe with a feather, will cauſe ſneezing; of the fauces, vomiting; while a violent impreſſion only cauſes ſimple pain; which is the caſe of the uterus in the hyſteric paſſion: for the cauſes of this diſeaſe, from obſervation, are the preternatural oſcillations of the uterine arteries, on the approach of the menſes, or their ſuppreſſion, when they are diſtended with blood; an irritation of the uterus from the fluor albus; various tumours in the uterus; the acrimony of the ſeminal fluids. Theſe affections of the uterus draw the other parts into conſent, as poiſons in the ſtomach produce convulſions, a ſyncope, and ſweats.

This diſeaſe has been very improperly confounded with the hypochondriac paſſion: for a ſtrangulation of the fauces, an intercepted breathing even to ſuffocation, a fainting away, a loſs of voice, a profound ſleep, are the true, proper, and eſſential ſigns and ſymptoms of this uterine diſeaſe.

An hyſteric fit is, according to Hoffman, generally preceded with a preſſing pain of the forehead, temples, or eyes, with an effuſion of tears, a dimneſs of ſight, a dulneſs of the mind and ſenſes, a loathing of all things. When the fit comes on, the patient is exceeding coſtive, and yet has a ſtrong ſtimulus to diſcharge her urine, which is as clear as water; the breathing is uneaſy, difficult, and ſhort; and a languor ſeizes the whole body: to theſe ſucceed a pain in the loins, a great ſhivering and ſhaking; the belly is hard and inflated; afterwards the navel is drawn inwards, and outwardly leaves a great pit; then they feel a ſort of a globe ariſe from the lower part of the belly to the hypochondria and diaphragm; ſoon after the heart begins to flutter and beat with a hard, unequal, and ſometimes intermitting pulſe; the extreme parts grow cold, the fauces are ſtraitened, the face pale, the breathing exceeding difficult, the voice ceaſes, the pulſe is almoſt imperceptible, and there is ſuch a ſtricture of the belly that no flatus can be emitted, nor no clyſter given. In ſome there are convulſions of the head and limbs; others lie in a profound ſleep, without ſenſe or motion; others have their face and neck look red and inflamed, with a ſtrong pulſe; and others again break out into immoderate laughter, and regaining their voice, ſay a great many ſilly things.

When they begin to come to themſelves, the pulſe, which was before weak, languid, and obſcure, becomes briſk, ſoft, and ſtrong; heat returns to the extreme parts, the face looks ruddy, the wind forces its way upwards, there is a rumbling in the belly, and at length the patients, waking as it were out of a profound ſleep, have their voices, ſenſes, and motion reſtored; yet they complain of a heavy pain in the head, a languor of the body, feet, and thighs. Some have continued in a fit ſo long, that they have been laid out for dead.

The hyſteric paſſion attacks women that are pregnant, or in child-bed; widows that are full of blood, after ſome grievous paſſion of the mind; or maids, after a ſudden ſuppreſſion of the menſes.

This diſeaſe, according to the laſt mentioned writer, may be cauſed by whatever promotes a more plentiful afflux of the blood and genital fluid of the uterine parts, or impedes the eruption of the menſes, or occaſions their ſuppreſſion: hence maids and widows are moſt ſubject thereto; alſo women of a ſanguine and bilious conſtitution, who live high, drink generous wines, feed on high-ſeaſoned aliment, and are ſubject to violent paſſions and commotions of the body and mind: on the other hand, thoſe who live a ſedentary life, feed on coarſe, acid, low diet, who have omitted uſual bleeding, who are oppreſſed with ſorrows, cares, and diſappointments, are liable to this diſeaſe; for by theſe the blood is thickened, the ſolid parts weakened, and conſequently the flowing of the menſes rendered more difficult. Likewiſe, ſudden terror, and the body being expoſed to uncommon cold during the time of the menſtrual flux, by giving it a check, procure hyſteric ſpaſms. Some are ſubject to the ſame diſorder from the ſmell of perfumes.

However dreadful and cruel this diſeaſe may appear, yet it is not very dangerous in itſelf, unleſs ill managed, or the patient be exceeding weak and valetudinary: it is moſt apt to turn into convulſions and an epilepſy.

In the cure, it muſt be carefully obſerved, whether the woman is plethoric, or exhauſted of blood and ſtrength. In the former caſe, the ſpaſms or convulſions are more violent and copious; bleeding is a preſent help, and many have been brought to themſelves who were ſeemingly dead, if the florid colour of their face had not ſhewn to the contrary.

In the fit it will be proper to apply fetid things to the noſe, ſuch as aſa fœtida, preparations of caſtor, partridges feathers burnt, &c. For women in child-bed, a girdle made of ruſſia leather, and bound pretty tight, is excellent. Likewiſe clyſters made with roots and ſeeds of lovage, which are ſpecifics, camomile-flowers, elder-flowers, veronica, the carminative ſeeds boiled in whey; to which may be added oil of elder, dill, or camomile. Externally plaſters made of opopanax, bdellium, galbanum, ſagapenum, and aſa fœtida, may be applied to the navel. Some greatly recommend fumigations for the uterus, of muſk, civet, ſtorax, and benjamin.

Inwardly, the patient may take thirty or forty drops of tincture of caſtor, in cold water; or if ſhe can ſwallow them, the following pills: take myrrh, ſagapenum, opopanax, aſa fœtida, ſaffron, and the theriaca andromache, of each half a dram; adding ſometimes ſix or eight grains of camphire and laudanum opiatum. From each ſcruple of this muſt ten pills be made, two of which are to be taken every hour, with a due quantity of water of camomile-flowers.

Some hyſterical diſorders, according to Dr. Mead, obſerve the lunar phaſes, and partake of the nature of an epilepſy: they ſeldom require bleeding, and purging ſhould be uſed with caution. Emetics are of greater ſervice, eſpecially a little before the fit. In the fit, the Dr. obſerves, the beſt medicines are thoſe which repair the loſs of ſpirits, as ruſſian caſtor, gum ammoniac, and ſalt of amber, in pills. Take gum ammoniac, two drams; ruſſian caſtor, one dram; ſalt of amber, half a dram; with a ſufficient quantity of the peruvian balſam: make this maſs into ſmall pills, and let the doſe, which is one ſcruple, be repeated as occaſion requires.

Out of the fit, he preſcribes native cinnabar, and wild valerian-root, as moſt proper for correcting the juices.

To prevent its degenerating into a chronic diſeaſe, particularly the hypochondriac paſſion, Hoffman adviſes, that care ſhould be taken to keep the menſes regular, which muſt be done by balſamics, compoſed of myrrh and amber, with bitter and carminative extracts, eſpecially zedoary and orange-peel, made into an elixir with a moderately ſpirituous menſtruum: this frequently helps the digeſtion, and promotes a regular menſtrual diſcharge.

But it is neceſſary to obſerve, that, in hyſteric caſes, the ſame remedies have a different effect on different women: ſome cannot bear fetid medicines, which to others are an immediate relief: ſome have fallen into a terrible ſyncope, and have come to themſelves by ſprinkling cold water on the face, when more powerful and ſpirituous things have failed. Others cannot endure hot things inwardly, nor outwardly, as baths, fomentations, liniments, and nervous applications. Anodynes and opiates, which procure eaſe and reſt to ſome, are very injurious to others who are greatly debilitated, and whoſe nerves are weak. Some have recovered from a violent paroxyſm by a draught of cold water, which given to others has increaſed the diſorder.

When purging is neceſſary, it will be beſt to preſcribe currants, well ſaturated with a gentle decoction of rhubarb.

Sydenham preſcribes the peruvian bark, morning and evening, in a ſcruple at a time, as an excellent remedy in hyſteric convulſions.

In the fits, beſides the remedies already mentioned, Aſtruc recommends a few grains of civet, or muſk, alone, or tied in a thin rag, and introduced into the vagina, which helps to diſcharge the morbid and noxious humours of the uterus. Out of the fit, he obſerves that mirth and exerciſe have alone often cured this diſtemper. The beſt remedies are caſtor, aſa fœtida, galbanum, ſagapenum, and myrrh; five grains in powder is a doſe, or ten drops of the tinctures; as alſo gentle purges of caſſia, manna, or infuſion of ſenna.

Hysteric colic, a common ſymptom of the hyſteric paſſion, attended with a moſt violent pain about the pit of the ſtomach; as alſo with a vomiting of a greeniſh humour, and great ſinking of the ſpirits. After a day or two the pain goes off, but upon the ſlighteſt motion or perturbation of the mind it ſoon returns again.

Neither bleeding nor cathartics have any place in the cure. According to Sydenham, it will be proper firſt to adviſe the patient to drink upwards of a gallon of poſſet-drink, to clear the ſtomach of its impurities, by throwing it up again, that the paregoric may not be hindered; afterwards give twenty-five drops of the thebaic tincture, in an ounce of the ſpirit of cinnamon-water. This laſt is to be repeated, at due intervals, till the ſymptoms diſappear; that is, the effect of one doſe muſt be known, before another is given: yet ſometimes in plethoric bodies, if the ſtrength will permit, it is better to prepare the way by bleeding and purging, or both, for an anodyne.

But if the hyſteric colic comes on by fits, the following may be uſed in the intervals, or when the fit is off: take large doſes of the balſam of Peru, that is, twenty, thirty, or forty drops, in a ſpoonful of the fineſt and whiteſt ſugar: this may be taken twice or thrice in a day.

HYSTEROLOGY, the ſame with hyſteron proteron. See the next article.

HYSTERON PROTERON, in grammar and rhetoric, a ſpecies of the hyperbaton, wherein the proper order of conſtruction is ſo inverted, as that the part of any ſentence which ſhould naturally come firſt is placed laſt, as in this of Terence, *valet & vivit*, for *vivit & valet*; and in the following of Virgil, *moriamur & in media arma ruamus*, for *in media arma ruamus & moriamur*.

HYSTEROPOTMI, ὑστεροποτμοι, in grecian antiquity, the ſame with deuteropotmi. See the article Deuteropotmi.

HYSTEROTOMIA, ὑστερoτομια, in anatomy, an anatomical diſſection of the uterus or womb. See the article Uterus.

HYSTEROTOMOTOCY, ὑστεροτομοτοκια, among chirurgical writers, the ſame with the cæſarian ſection. See Cæsarian.

Fig. 1. JACK.

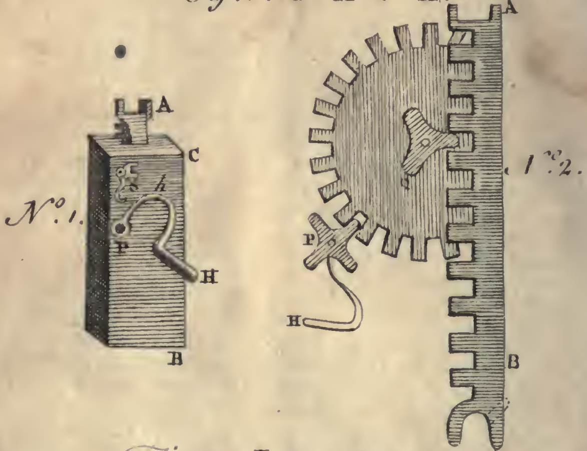


Fig. 2. JACKALL.

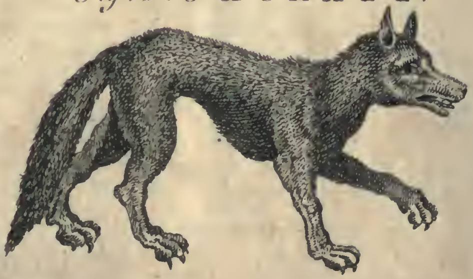


Fig. 3. JASMINE.

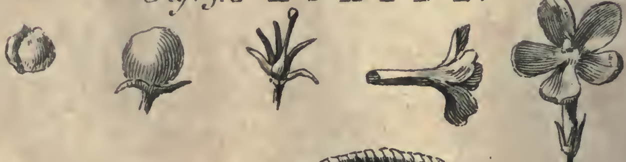
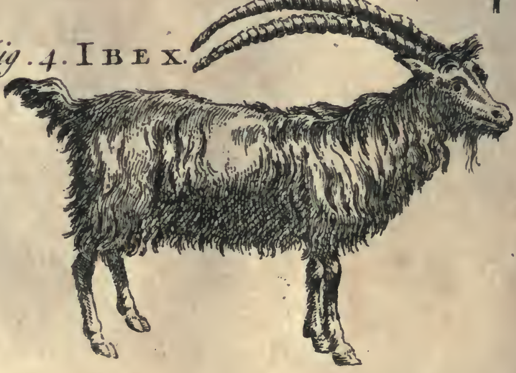


Fig. 4. IBEX.



J. Jeff

I.

I, or i, the ninth letter, and third vowel of the alphabet, is pronounced by throwing the breath ſuddenly againſt the palate, as it comes out of the larynx, with a ſmall hollowing of the tongue, and nearly the ſame opening of the lips and talk as in pronouncing *a* or *e*. Its ſound varies; in ſome words it is long, as *high*, *mind*, &c. in others ſhort, as *bid*, *hid*, *ſin*, &c. in others again, it is pronounced like *y*, as in *collier*, *onion*, &c. and in a few, it ſounds like *ee*, as in *machine*, *magazine*, &c. No engliſh word ends in *i*, *e* being either added to it, or elſe the *i* turned into *y*.

But beſides the vowel, there is the jod conſonant; which becauſe of its different pronunciation, has likewiſe a different form, thus J, j. In engliſh, it has the ſoft ſound of *g*; nor is uſed, but when *g* ſoft is required before vowels, where *g* is uſually hard: thus we ſay, *jack*, *jet*, *join*, &c. inſtead of *gack*, *get*, *goin*, &c. which would be contrary to the genius of the engliſh language. See the article ENGLISH.

I, uſed as a numeral, ſignifies no more than one, and ſtands for ſo many units as it is repeated times: thus I, one; II, two; III, three, &c. and when put before a higher numeral, it ſubſtracts itſelf, as IV, four; IX, nine, &c. but when ſet after it, ſo many are added to the higher numeral, as there are I's added: thus VI is $5 + 1$, or ſix; VII, $5 + 2$, or ſeven; VIII, $5 + 3$, or eight. The antient Romans likewiſe uſed IↃ for 500, CIↃ for 1000, IↃↃ for 5000, CCIↃↃ for 10,000, IↃↃↃ for 50,000, and CCCIↃↃↃ for 100,000. Farther than this, as Pliny obſerves, they did not go in their notation; but when neceſſary, repeated the laſt number, as CCCIↃↃↃ, CCCIↃↃↃ for 200,000; CCCIↃↃↃ, CCCIↃↃↃ, CCCIↃↃↃ for 300,000; and ſo on.

I, uſed as an abbreviature, is often uſed for the whole word Jeſus, of which it is the firſt letter.

AAR, a river of the biſhopric of Liege, which falls into the Maes, at Maeſtricht.

ABAJAHITES, a modern ſect of Mahometans, who teach that the knowledge of God extends not to all things, but is perfected by experience; and that he governs the world according to the courſe of contingent events, as not having had from eternity a perfect knowledge of all things future. This doctrine is looked upon, by the other muſſulmen, as impious and blaſphemous.

JABLUNKA, a town of Sileſia, in the territory of Treſchen: eaſt long. 18°, north lat. 49° 37′.

JACCA, a city and biſhop's ſee of Arragon, in Spain, fixty miles north of Saragoſſa: weſt long. 50′, and north lat. 42° 50′.

JACENT, a term applied by Helmont to nature, when a diſeaſe is riſen to a head, and the morbific matter ſtrives to ſuppreſs the vital flame.

JACK, in mechanics, an inſtrument of common uſe for raiſing heavy timber, or very great weights of any kind. See plate CXLII. fig. 1. n° 1.

But as the wheel-work of it is ſhut up in the ſtrong piece of timber C B, we have given a repreſentation of it (*ibid.* n° 2.) where you muſt ſuppoſe the rack A B at leaſt four times as long in proportion to the wheel Q, it being here ſo much contracted; and the teeth, which will then be four times more in number, to be contained about three in an inch. Then if the handle H P be ſeven inches long, five turns of it, that is five times twenty-two inches, or 110 inches, will be the velocity of the power; whilſt the weight raiſed by the claw A, or depreſſed by the claw B, moves one inch; for as the pinion of the handle has but four leaves, and the wheel Q twenty-three, there muſt be five revolutions of the handle to turn the wheel once round; whoſe three-leaved pinion, R, will in that revolution juſt move the rack A B three teeth or one inch.

This might have been alſo known without ſeeing, or even knowing, the number of the teeth of the wheel and pinions, by meaſuring a revolution of the handle in n° 1. and comparing the ſpace gone through by it with the ſpace gone through by the ends of the rack A or B.

Sometimes this machine is open behind, from the bottom almoſt up to the wheel

Q, to let the lower claw, which in that caſe is turned up at B, draw up any weight; and when this is effected to a ſufficient height, it is prevented from falling down again by putting the end of the hook S (*ibid.* n° 1.) fixed to a ſtaple, over the curved part of the handle at *h*.

All parts of this machine muſt be made very ſtrong, but chiefly thoſe which immediately ſuſtain the weight.

The common kitchen jack is a compound engine; where the weight is the power applied to overcome the friction of the parts, and the weight with which the ſpit is charged; and a ſteady and uniform motion is obtained by means of the fly. See the article FLY.

Smoke **JACK**. See SMOKE JACK.

JACK-WAMBASIUM, in our old writers, a kind of defenſive coat-armour, worn by horſemen in war, not made of ſolid iron, but of many plates faſtened together, which ſome perſons by tenure were bound to find upon any invaſion.

JACK, in ichthyology, a name ſometimes given to the lucius or pike. See the article LUCIUS.

JACK-FLAG, in a ſhip, that hoiſted up at the ſprit-ſail top-maſt head. See FLAG.

JACK-DAW, in ornithology, a ſpecies of corvus, with a black and grey head, a browniſh black body, and the wings and tail black.

It is one of the ſmalleſt of the crow-kind, but an erect and well-ſhaped bird. See the article CORVUS.

JACKALL, in zoology, an animal of the dog-kind, with a ſlender ſnout. See the article CANIS.

It is a very beautiful creature, and ſo like a dog, as to be miſtaken at firſt ſight for ſome mungrel breed of that animal. See plate CXLII. fig. 2.

Its ſize is that of a ſmall hound; and, in the Eaſt, where it is a native, there are vaſt packs of them, often more than 200 in a company, which hunt animals they would never dare to attack ſingle. It is not impoſſible that lions and other beaſts of prey may be alarmed by the cries of theſe animals in their chace, and fall in and rob them of their prey; but the general opinion of their attendance on the lion, is fabulous.

JACOB's STAFF, a mathematical inſtrument otherwiſe called croſs-ſtaff. See the article CROSS-STAFF.

JACOBINE, or **JACK**, in ornithology, a very ſmall ſort of pigeon, with a range of feathers inverted quite over the hinderpart of the head; bearing ſome reſemblance t a friar's hood, whence the name.

JACOBINE MONKS, the ſame with the dominicans. See DOMINICANS.

JACOBITES, a term of reproach beſtowed on the perſons, who vindicating th doctrines of paſſive-obedience and nonreſiſtance with reſpect to the arbitrary proceedings of princes, diſallow of th late revolution, and aſſert the ſuppoſe rights, and adhere to the intereſts of th late abdicated king James and his family

JACOBITES, in church-hiſtory, a ſect c chriſtians in Syria and Meſopotamia; ſ called either from Jacob, a Syrian, wh lived in the reign of the emperor Mauricius; or from one Jacob, a monk, wh flouriſhed in the year 550.

The jacobites are of two ſects, ſome fo lowing the rites of the latin churc and others continuing ſeparated from th church of Rome. There is alſo at pre ſent a diviſion among the latter, who hav two rival patriarchs, one of whom reſide at Caramit, and the other at Derzapha ran. As to their belief, they hold b one nature in Jeſus Chriſt; with reſpe to purgatory and prayers for the dea they are of the ſame opinion as the Greek and other eaſtern chriſtians: they co ſecrate unleavened bread at the euch riſt, and are againſt confeſſion, believir that it is not of divine inſtitution.

JACOBITE MONKS, religious, of the ſect jacobites, in Armenia, Meſopotamia, &

JACOBUS, an antient gold coin wor twenty-five ſhillings. See COIN.

JADE STONE, the name given to a har greyiſh-green ſpecies of jaſper, of whi the Turks generally make the handles the ſabres of great people. See the a ticle JASPER.

JAFFA, antiently called JOPPA, is a po town of Paleſtine in aſiatic Turky, ſit ated thirty miles north-weſt of Jeru lem: eaſt long. 36°, north lat. 32° 2c

JAFNAPATAN, a port-town at the no end of the iſland of Ceylon, in the E Indies; ſubject to the Dutch: eaſt lo 79°, north lat. 10°.

JAGENDORF, a city of Sileſia, twe miles north-weſt of Tropaw: eaſt lo 17° 6′, north lat. 50° 8′.

St. **JAGO**, the chief of the Cape V iſlands, in Africa, 300 miles weſt of C Verd; ſubject to Portugal: weſt lo 24°, north lat. 15°.

St. **JAGO**, the capital of the iſland of Cu 100 miles north-weſt of Jamaica: w long. 76° 30′, north lat. 20°.

St. JAGO, the capital of the province of Chili, in South America, ſituated ſix miles weſt of the mountains of Andes, and eighteen eaſt of the Pacific ocean: weſt long. 77°, ſouth lat. 34°.

JAGO DE LA VEGA, or Spaniſh Town, the capital of Jamaica, ſituated at the ſouth-eaſt part of the iſland, about ſeven miles north-weſt of Port Paſſage and the bay of Port Royal: eaſt long. 76° 30′, north lat. 18° 20′.

JAGODNA, a town of european Turky, in the province of Servia, ſituated on the river Moraw: eaſt long. 22°, north lat. 43° 20′.

JAICZA, a city of european Turky, in the province of Boſnia, fifty miles north-eaſt of Boſnaſeraio: eaſt long. 18°, north lat. 45° 5′.

JAIL, or GAOL. See GAOL.

JALAP, *jalapa*, in botany, a plant of the pentandria-monogynia claſs, called by Linnæus mirabilis. See MIRABILIS.

Jalap root is compact and firm, of a wrinkled ſurface, and of the deepeſt brown colour within, moſt diſagreeable to the taſte, and which takes fire moſt readily, and burns moſt briſkly when held to the flame of a candle.

With us it is of uſe in extemporaneous preſcription, given in the form of boluſes and draughts. Its doſe is from twenty to thirty or thirty-five grains. Its common correctives are ginger and cream of tartar; but nature has indeed prepared it ſo well to our hands, that it needs no addition. The beſt method of giving it is in a draught made with white-wine, and prepared at leaſt twelve hours before the time when it is to be taken; in which caſe, the wine has power to open the body of the medicine, and prepare it for acting with the greater eaſe.

It is an excellent purgative in dropſical and all other caſes where ſerous humours are to be evacuated. The only caution neceſſary in the uſe of it is, that it ſhould not be given in acute fevers, nor to perſons of dry and hot conſtitutions; for in theſe caſes, it is liable to the ſame miſchiefs as other acrid purgatives, and will ſometimes bring on heat and inflammations in the viſcera.

The preparations of jalap in uſe with us, are a tincture, an extract, and a reſin. To prepare the tincture, take of the root of jalap, eight ounces, put it into a quart of proof ſpirit, and after digeſtion ſtrain off the ſpirit.

This tincture purges briſkly, and is of uſe in all caſes where the root in ſubſtance is proper; its doſe is from half a dram to two drams.

The extract is made thus: pour upon jalap-root powdered, rectified ſpirit of wine, and with a due heat draw a tincture, then boil the reſidue ſeveral times in water: after ſtraining, draw off the ſpirit from the firſt tincture till it begins to thicken; inſpiſſate alſo the ſtrained decoctions; then mix the two extracts, and with a gentle fire reduce them to the conſiſtence of a pill.

The two extracts will thus unite into an uniform maſs, and retain all the virtues of the root. This extract is of the ſame virtue as the former tincture, and its doſe is from ten to twenty grains.

To prepare the reſin, take any quantity of the root of jalap well bruiſed, pour on it as much ſpirit as will riſe four inches above the root, digeſt them in a ſand heat till the tincture is extracted; filtrate the tincture; then diſtil off one half of the ſpirit; pour to what remains a ſufficient quantity of water, and the reſin of the jalap will be precipitated to the bottom in the form of turpentine. Waſh it ſeveral times in freſh water, and dry it for uſe by a very gentle heat.

This purges the moſt violent of all the preparations of jalap; its doſe is from ten to twelve grains; but the extract is greatly preferable to it on all occaſions.

JALOFFS, a country and people of Africa, lying on the north ſide of the river Gambia, near its mouth: weſt long. 14°, north lat. 13° 40′.

JAM, or JAMB, among carpenters, *&c.* See the article JAMB.

JAMAGOROD, a town of the province of Ingria, in Ruſſia, ſituated twelves miles ſouth eaſt of Narva: eaſt long. 28°, north lat. 59° 15′.

JAMAICA, an iſland of America, ſituated in the Atlantic ocean, between 76° and 79° of weſt longitude, and between 17° and 18° odd minutes north latitude, near 5000 miles ſouth-weſt of England, 100 miles ſouth of the iſland of Cuba, and 350 miles north of Terra Firma. The iſland lies eaſt and weſt, and is about 140 miles long, and 60 broad. The wind ſets on the ſhore almoſt all the day in every part of the iſland, and off the ſhore in the night; it ſometimes hails, but the people there never ſee froſt or ſnow. The produce of the iſland is chiefly ſugar, but there is plantations of coffee, of the cocoa or chocolate tree, of indico, tobacco, pepper, cotton, woods for dying, and the mahogany and machineel wood, ginger, medicinal drugs and gums. The common diſeaſes of the country are fevers, fluxes, and the dry gripes.

Jamaica pepper, *pimenta,* in the materia medica. See the article Pimenta.

Jamaica wood, a name ſometimes given to brazil. See the article Brazil.

JAMANA, the chief town of a province of Arabia, alſo of the ſame name: eaſt long. 47° 15′, north lat. 25°.

JAMB, or Jaumb, among carpenters, an appellation given to door-poſts, as alſo to the upright poſts at the ſides of window-frames.

Jambs, among bricklayers, *&c.* denote the upright ſides of chimnies, from the hearth to the mantle-tree.

JAMBA, a city of the hither India, and the capital of the province of the ſame name, ſituated 220 miles north-eaſt of Delli: eaſt long. 82°, north lat. 31°.

IAMBIC, in antient poetry, a ſort of verſe, ſo called from its conſiſting either wholly, or in great part, of iambus's. See the article Iambus.

Ruddiman makes two kinds of iambic, *viz.* dimeter and trimeter; the former containing four feet, and the latter ſix. And as to the variety of their feet, they conſiſt wholly of iambus's, as in the two following verſes of Horace.

1 2 3 4 5 6
Dim. *Inar|ſit æ|ſtuo|ſius|*
Trim. *Suis|& i|pſa ro|ma vi|ribus|ruit.*

Or, a dactylus, ſpondeus, anapæſtus, and ſometimes tribrachys, obtain in the odd places; and the tribrachys alſo in the even places, excepting the laſt. Examples of all which may be ſeen in Horace, as:

Dimeter.

1 2 3 4 5 6
Canidi|a tra|ctavit|dapes|
Vide|re prope|rantes domum|

Trimeter.

Quò quò|ſcele|ſti rui|tis aut|cur dex|teris.
Prius|que cœ|lum ſi|det in|ferius|mari.
Aliti|bus at|que cani|bus homi|cid' he|ctorem.
Pavidum|que lepo|r aut ad|venam|laqueo|
gruem.

JAMBOLIFERA, in botany, a genus of the octandria-monogynia claſs of plants, the flower of which conſiſts of four petals, and is of an infundibuliform ſhape.

JAMBUS, in antient poetry, a ſimple foot conſiſting of a ſhort and a long ſyllable, as *pios.* See the article Foot.

JAMBY, a town on the eaſt ſide of the iſland of Sumatra, in the Eaſt Indies, ſituated in 101° eaſt long. and in 1° 30′ ſouth lat.

JAMES, or *knights of St.* James, a military order in Spain, firſt inſtituted about the year 1170, by Ferdinand II. king of Leon and Galicia. The greateſt dignity belonging to this order is grand maſter, which has been united to the crown of Spain. The knights are obliged to make proof of their deſcent from families that have been noble for four generations, on both ſides: they muſt alſo make it appear that their ſaid anceſtors have neither been Jews, Saracens, nor Heretics; nor have ever been called into queſtion by the inquiſition. The novices are obliged to ſerve ſix months in the galleys, and to live a month in a monaſtery; they obſerve the rule of St. Auſtin, making no vows but of poverty, obedience, and conjugal fidelity.

St. James's day, a feſtival of the chriſtian church obſerved on the 25th of July, in honour of St. James the greater, ſon of Zebedee.

Epiſtle of St. James, a canonical book of the New Teſtament, being the firſt of the catholic or general epiſtles; which are ſo called, as not being written to one but to ſeveral chriſtian churches.

This general epiſtle is addreſſed partly to the believing and partly to the infidel Jews; and is deſigned to correct the errors, ſoften the ungoverned zeal, and reform the indecent behaviour of the latter; and to comfort the former under the great hardſhips they then did, or ſhortly were to ſuffer, for the ſake of chriſtianity.

James town, once the capital of Virginia in America, and of James-county, ſituated in a peninſula on the north ſide of James, or Pouhatan river, in weſt longitude 76° 30′, north lat. 37° 30′.

JAMPNUM, a word formerly uſed in fines of lands, *&c.* where it denotes gorſy ground: it is ſuppoſed to be derived from the french *jaune,* yellow; becauſe the flowers of furze or gorſe are of that colour.

JANEIRO, a province of Brazil, in South America, ſituated between 44° and 49° of weſt long. and between the tropic of capricorn and 22° of ſouth lat.

JANIKAW, or Janowits, a town of Bohemia, ſituated forty-five miles ſouth-eaſt of Prague.

JANITOR, in anatomy, a name uſed by ſome affected writers for the pylorus. See the article PYLORUS.

JANITRIX, in anatomy, a name given to the vena portæ. See VENA.

JANIZARIES, an order of the turkiſh infantry, reputed the grand ſignior's guards, and the main ſtrength of the ottoman army.

The janizaries were at firſt compoſed only of the ſons of chriſtians, delivered up as a tribute by their parents, in return for the privilege of enjoying liberty of conſcience; and were taken at twelve years of age, to the end that forgetting their country and religion, they might know no other parent beſides the ſultan. Of late, however, this cuſtom has been left off, the fine for the free exerciſe of their religion being generally paid in money.

Their dreſs, which is given them by the grand ſignior every year, on the firſt day of ramazan, is a long veſt with ſhort ſleeves, which they tie about their waiſts with a linen-ſaſh ſtriped with many colours, and adorned at both ends with gold or ſilver fringe, and over this they wear a looſe upper veſt of blue cloth. They wear no turban, but inſtead of it a felt cap, and a long hood of the ſame ſtuff, which hangs over their ſhoulders; and on days of ceremony, they adorn themſelves with long feathers ſtuck in a caſe in the front of their bonnets. The arms of the janizaries in Europe are, in time of war, a fuſil, or a muſquet, and a cartouch-box, which hangs at their left ſide: but in Aſia, where powder and fire-arms are more ſcarce, they carry a bow and arrows with a poignard.

Their pay is from two aſpers a day to twelve; for when they perform ſome important ſervice, or have children, their pay is increaſed. All the turkiſh infantry are at preſent generally called by the name of janizaries, but ſuch only are really ſo, who derive their inſtitution from Ottoman I. and their peculiar privileges from Amurath III. which do not amount to above 25000 men: however, their being exempted from the payment of taxes, and the performance of public duties, induce abundance of perſons to bribe the officers to take them under their protection, and to make them paſs for janizaries, without receiving any pay. By means of this intermixture of the real janizaries with thoſe admitted by corruption, their number at preſent amounts to above 100,000. And yet not accounting any but ſuch as are effectively janizaries, their body has ſometimes been ſo formidable as to dethrone the ottoman monarchs, and ſuddenly to change the whole face of the empire.

JANIZARIES, are alſo certain officers at Rome, otherwiſe called participantes, by reaſon of certain rights or dues which they enjoy in the annates, bulls, or expeditions of the Roman chancery. Moſt authors are miſtaken in the nature of their office: the truth is, they are officers of the third bench, or college, of the Roman chancery: the firſt bench conſiſts of writers, the ſecond of abbreviators, and the third of janizaries, who are a kind of correctors, or reviſors, of the pope's bulls.

JANNA, a town of european Turky, the capital of a province of the ſame name, being the antient Theſſaly, ſituated eaſt long. 22°, north lat. 39°.

JANSENISTS, in church-hiſtory, a ſect of the roman catholics in France, who follow the opinions of Janſenius, biſhop of Ypres, and doctor of divinity of the univerſities of Louvain and Douay, in relation to grace and predeſtination.

In the year 1640, the two univerſities juſt mentioned, and particularly father Molina and father Leonard Celſus, thought fit to condemn the opinions of the jeſuits on grace and free-will. This having ſet the controverſy on foot, Janſenius oppoſed to the doctrine of the Jeſuits the ſentiments of St. Auguſtine, and wrote a treatiſe on grace, which he entitled Auguſtinus. This treatiſe was attacked by the jeſuits, who accuſed Janſenius of maintaining dangerous and heretical opinions; and afterwards, in 1642, obtained of pope Urban VIII. a formal condemnation of the treatiſe wrote by Janſenius: when the partiſans of Janſenius gave out that this bull was ſpurious, and compoſed by a perſon entirely devoted to the jeſuits. After the death of Urban VIII. the affair of janſeniſm began to be more warmly controverted, and gave birth to an infinite number of polemical writings concerning grace; and what occaſioned ſome mirth, was the titles which each party gave to their writings: one writer publiſhed, The torch of St. Auguſtin, another found ſnuffers for St. Auguſtin's torch, and father Vernon formed a gag for the janſeniſts, *&c.* In the year 1650, ſixty-eight biſhops of France ſubſcribed a letter to pope Innocent X. to obtain an enquiry into, and condemnation of the five following propoſitions, extracted from Janſenius's Auguſtinus: I. Some of God's commandments are impoſſible to be obſerved by the righteous, even though they endeavour, with all their power, to accompliſh them. II. In the ſtate of corrupted nature, we are incapable of reſiſting inward grace. III. Merit and demerit in a ſtate of corrupted nature, does not depend on a liberty which excludes neceſſity, but on a liberty which excludes conſtraint. IV. The ſemipelagians admitted the neceſſity of an inward preventing grace for the performance of each particular act, even for the beginning of faith, but they were heretics in maintaining that this grace was of ſuch a nature, that the will of man was able either to reſiſt or obey it. V. It is ſemipelagianiſm to ſay, that Jeſus Chriſt died, or ſhed his blood, for all mankind, in general.

In the year 1652, the pope appointed a congregation for examining into the diſpute in relation to grace. In this congregation Janſenius was condemned, and the bull of condemnation, publiſhed in May 1653, filled all the pulpits in Paris with violent outcries and alarms againſt the hereſy of the janſeniſts. In the year 1656, pope Alexander VII. iſſued out another bull, in which he condemned the five propoſitions of Janſenius. However, the janſeniſts affirm, that theſe propoſitions are not to be found in his book; but that ſome of his enemies having cauſed them to be printed on a ſheet, inſerted them in the book, and thereby deceived the pope. At laſt Clement XI. put an end to the diſpute by his conſtitution of July 17, 1705; in which, after having recited the conſtitutions of his predeceſſors in relation to this affair, he declares, "That in order to pay a proper "obedience to the papal conſtitutions "concerning the preſent queſtion, it is "neceſſary to receive them with a re"ſpectful ſilence." The clergy of Paris, the ſame year, approved and accepted this bull, and none dared to oppoſe it.

This is the famous bull *unigenitus*, ſo called from its beginning with the words *unigenitus dei filius*, &c. which has occaſioned ſo much confuſion in France.

JANUARY, in chronology, the firſt month of the year, ſo called from Janus, one of the antient roman deities, painted with two faces; one whereof was ſuppoſed to look towards the new year, and the other towards the old.

This month contains thirty-one days, and was introduced into the year by Numa Pompilius, Romulus's year beginning in the month of March. The chriſtians heretofore faſted on the firſt day of January, by way of oppoſition to the ſuperſtition of the heathens, who, in honour of Janus, obſerved this day with feaſtings, dancings, maſquerades, *&c.* See the article YEAR.

JAPAN, or *iſlands of* JAPAN, are ſituated between 130° and 144° of eaſt longitude, and between 30° and 40° north latitude.

JAPAN-EARTH, *catechu*, in the materia medica. See the article CATECHU.

JAPANNING, the art of varniſhing and drawing figures on wood, *&c.* in the manner as is done by the natives of Japan.

This method of preparing woods for japanning is as follows. 1. Take plaſterer's ſize, diſſolve it over the fire, and mix it with whiting finely powdered, till it is of a good body, but not too thick. 2. By means of a ſtrong bruſh lay your work over with the former mixture, and letting it dry very well, repeat this till the wood is perfectly plain, or the pores and crevices ſufficiently filled up; and when it is thoroughly dry, rub the work over with a wet rag till it is rendered as ſmooth as poſſible: this work is called water-planing. 3. After this, waſh over the work with the thickeſt of ſeed-lac varniſh till it is very ſmooth, letting it ſtand to dry between every waſhing. 4. In a day or two's time, you may varniſh it over with black, or whatever other colour you deſign, and when it is dry, finiſh it by poliſhing. See the article VARNISH.

After the ſame manner carved figures are to be primed, alſo frames, cabinets, ſtands, tea-tables, *&c.* ſaving that theſe are not to be poliſhed, and therefore do not require ſo great a body of varniſh; but for the tops of tables, boxes, ſides of cabinets, *&c.* when the wood is ordinary and rough grained, as deal, oak, *&c.* you may uſe common joiners glue, diſſolved in water till it is fine and thin, into which put the fineſt ſaw-duſt, till it is indifferently thick; then with a bruſh lay your wooden work over with it, and when it is dry, repeat it ſo often till all the roughneſs and grain of the wood is ſufficiently hidden; and two or three days after let it be ſcraped with a ſcraper, as pear-tree and olive wood are done, to make it as ſmooth as poſſible: then varniſh it as before directed. This if well done might not come behind any other work either for beauty or durability; but, however, thoſe woods that are firm and cloſe grained, are chiefly to be choſen.

Method of taking off japan patterns. 1. Having laid your ground, whether black, or of any other colour, and rendered it fit for drawing; and having your draught or deſign before you on paper, either drawn or printed, do as follows. 2. Rub this draught or print all over the back-ſide with whiting, or fine chalk; wiping off all that whiting which lies looſe upon the paper, then laying this paper upon the table, or piece of varniſhed work, with the whited ſide next it upon the very place where you would have that figure made, with a needle, not ſharp pointed, fixed in a wooden handle, and called a tracing-pencil, go over and trace as much of the drawing as you think proper: thus, by means of the whiting, you will have the groſs form of the draught, and ſuch other lines as will be a direction to you how to perform what you would have done. 3. Having done this, if you draw in gold-ſize, uſe fine cinnabar mixt with gum water, and with a ſmall pencil dipt into it, go over all the lines made by the chalk: this will hold it ſo as not to come off. 4. If you work your metals or colours in gum-water, then trace over your deſign with gum water mixt with gold or braſs-duſt, by either of theſe ways when it is dry and finiſhed, *viz.* either in gum-water or gold-ſize, you may complete and finiſh your work.

Method of japanning wood. The wood being prepared as before directed, it is japanned with black, as follows. 1. Take of the thickeſt lack-varniſh, ſix ounces: and lamp-black, enough to colour it: with this waſh over your piece three times, letting it dry thoroughly between each time: again, with the ſame varniſh, waſh it over three other ſeveral times, letting it dry as before, and ruſh it ſmooth between each waſhing. 2. Then take the following: of thickeſt ſeed-lac varniſh, ſix ounces; and venice turpentine, one ounce; waſh over your work with it ſix times, letting it ſtand twelve hours between the three firſt and the three laſt varniſhes. 3. Your work being thus far done, take the following japan-varniſh: of the fineſt ſeed-lac varniſh, ſix ounces; of lamp-black, a ſufficient quantity; mix them, and with that let your work be waſhed twelve times, ſtanding twelve hours betwixt the firſt ſix and the laſt ſix waſhing. 4. Then letting it ſtand to dry for ſix or ſeven days, poliſh it with tripoli and a rag, as before directed: but in poliſhing you muſt work at it only till it is almoſt ſmooth, and then let it ſtand by for two days: afterwards poliſh it again, almoſt enough; then let it ſtand for ſix days, after which finiſh the poliſhing of it; finally, clear it up with oil and lamp-black, by which means you will have a good black japan ſcarce at all inferior to the true japan.

For a white japan. 1. Lay the ground with iſing-glaſs ſize mixed with as much whiting ſcraped into it as will make it of a proper thickneſs; with this whiten your work once over, and being thoroughly dry, do it over again; and in like manner repeat it the third time; after which let it ſtand for twelve hours; covering it from duſt; ruſh it with dutch ruſhing as near the grain of the wood as is proper. 2. Then taking firſt iſing-glaſs ſize, and flake white, ſo much as will make the ſize of a fair body, mix them well together, and with this go over your work three ſeveral times, letting it dry between each time, and ruſh it as before. 3. Then take white ſtarch boiled in fair water, till it is ſomewhat thick, waſh over the whole work twice with it, blood-warm; letting it dry as before. 4. Letting it ſtand for a day or two, it being firſt waſhed with rectified ſpirit of wine, to clear it from the duſt, dip a pure clean pencil into the fineſt white varniſh, and do over the work ſix or ſeven times; and if this be well done, it will give a finer gloſs than if it were poliſhed: if it be not well done, poliſhing will be neceſſary, for which reaſon you muſt give it five or ſix varniſhes more. In poliſhing you muſt make uſe of the fineſt tripoli; and inſtead of lamp-black and oil, muſt uſe putty and oil, and conclude with white ſtarch mixed with oil.

Common red japan. 1. Take iſing-glaſs ſize, fine vermilion, a ſufficient quantity, as much as is proper; with the former mixture do your work over four times; firſt warming it by the fire, letting it dry each time, and ruſhing it as before. 2. This being done, waſh it over eight times with ordinary ſeed-lac varniſh, and ſet it by for twelve hours: then ruſh it again, but ſlightly, to make it look ſmooth. 3. And, laſtly, for an exquiſite outward covering, waſh it ten times with the beſt lac-ſeed varniſh; let it lie ſeven days to dry, and then poliſh it with tripoli, and clear it up with oil and lamp-black.

A deeper red japan may be made by mixing fine ſanguis draconis, in powder, with the varniſh; and a pale red japan may be had by mixing ſo much white lead with it, as to make it of whatever degree of paleneſs you pleaſe.

Blue japan. 1. Take gum-water what quantity you pleaſe, and a ſufficient quantity of white lead; grind them well upon a marble; take iſing-glaſs ſize what quantity you pleaſe, and of the fineſt and beſt ſmalt, a ſufficient quantity; mix them well together; then add to them of the white lead, ground as before, ſo much as will give it a ſufficient body; mix all together to the conſiſtence of a paint. 2. Do you work over with this mixture three or four times, till you perceive the blue to lie with a good and fair body, letting it dry thoroughly between each time: if your blue is too pale, put more ſmalt among your ſize, without any white lead, and ſo *vice verſa*. 3. Then ruſh it ſmooth, and go over it again with a ſtronger blue; and when it is dry, waſh it three times with the cleareſt iſing-glaſs ſize alone, and let it ſtand for two days to dry, covering it. 4. Warm your work gently at the fire, and with a pencil varniſh it over with the fineſt white varniſh, repeating it ſeven or eight times, letting it ſtand to dry two days as before. After which repeat again the waſhes ſeven or eight times in like manner. 5. Let it now ſtand for a week, and then poliſh it as before, and clear it up with lamp-black and oil.

Cheſnut-coloured japan. Take indian red, grind it with iſing-glaſs ſize upon a porphyry-ſtone, till they are as ſoft and as fine as butter: then mix a little white lead, which grind ſtrongly; and, laſtly, lamp-black, in due proportion.

A tortoiſe-ſhell japan. Firſt lay a white ground as before directed; then with proper colours, as vermilion, auripigment, *&c.* duly mixed with turpentine-varniſh, ſtreak and cloud or ſhadow the white ground with any irregular fancy at pleaſure, in imitation of tortoiſe-ſhell: then let it ſtand to dry, and ſtriking it here and there with reddiſh-yellow varniſh, mixed with a little cinnabar, cloud the work up and down, touching it up alſo with varniſh mixed with lamp or ivory-black. Having done this, varniſh it five or ſix times over with the fineſt white varniſh, letting it dry between every waſhing.

Japanning with gold ſize. The ſize being laid over that part only which you intend to gild, as already directed, let it remain there till it is ſo dry, that when you put your finger on it, it be glutinous and clammy, but not ſo moiſt that the particles ſhould come off with your fingers. It is in this temper that the gold is to be applied: then take a piece of waſhing-leather, or the like, and wrapping it round your fore-finger, dip it in the gold-duſt, and rub it where your gold-ſize is laid; for it will ſtick no where but on the ſize, and if any gold duſt lies about your work, bruſh it away with a fine clean varniſhing bruſh. Then, with your pencil, draw that part with gold-ſize alſo which is deſigned for your copper, and letting it dry as in the former caſe, cover it over with copper-duſt in the ſame manner. Having done this, lay your ſilver-ſize, and when it is dry, as before, lay on your ſilver-duſt, as in the two former. But it is to be obſerved, that the metalline colours are to be laid ſucceſſively one after another, letting each be covered and thoroughly dry before you enter upon a diſtinct colour. After all theſe, the other colours which are not metalline are to be laid on with gum-water, reſerving the rock, *&c.* for the laſt part of the work. Let your ſize be of a due conſiſtence, neither too thick nor too thin, that it may run ſmooth and clean. See the article SIZE.

Japanning metals with gum-water. Take gum-water, put it into a muſcle-ſhell, with which mix ſo much of your metal or colour as may give it a proper conſiſtence, ſo that it may run fine and ſmooth; having prepared and well mixed your metals and colours, lay on your deſign; your gum-water, being thoroughly dried, you are to run it over with fine ſeed-lac varniſh, and afterwards poliſh it and clear it.

Laying ſpeckles or ſtrewings on japan work. To do this, either on outſide or inſide boxes, drawers, *&c.* mix your ſpeckles with ordinary lac-varniſh, ſo much as may make it fit to work, but not ſo thick as for colour, and mix them well with a proper bruſh. Warm the work to be done gently by the fire, and with a pencil waſh it over with the former mixture, and when it is dry repeat it again, and ſo often till your ſpeckles lie as thick and even as you deſire. When it is thoroughly dry, go over and beautify the work three or four times with ſeed-lac varniſh mixt with turpentine; and ſo let it dry, and the work is finiſhed, except you have a mind to poliſh it. But if you poliſh it, you muſt waſh it eight or ten times over with the beſt ſeed-lac varniſh, letting it ſtand to dry every time, and afterwards poliſh it, as before directed. All ſorts of coloured ſpeckles may be thus uſed, except thoſe of ſilver, the laying on of which requires the beſt and fineſt of the lack-varniſh, or the beſt white varniſh, which muſt make it fit for poliſhing; but if you have not a mind to poliſh it, fewer waſhes of the varniſh will be ſufficient.

Japanned and laquered ware of the Eaſt Indies, pay duty for every 100 l. groſs value at the ſale 38 l. on importation, and the drawback is 35 l. 12 s. 6 d. on exportation.

JASIONE, in botany, a genus of the ſyngeneſia-polygamia-monogamia claſs of plants; the partial corolla whereof conſiſts of five lanceolated erect petals, connected at the baſe; the fruit is a roundiſh capſule, bilocular, and coronated with a proper calyx; the ſeeds are ſmall.

JASMINE, jaſminum, in botany, a genus of the diandria-monogynia claſs of plants, the flower of which is monopetalous, with a long cylindraceous tube, and a plain limb, divided into five ſegments: the fruit is a ſmooth, oval, and bilocular berry, containing two large oblong ſeeds, covered with a membrane, and convex on one ſide and concave on the other. See plate CXLII. fig. 3.

According to Dale, the flowers of white jaſmine are emollient, aperient, and heating; and with theſe intentions preſcribed in difficult breathing, the cough, pleuriſy, pain of the inteſtines, *&c.*

ennel-leaved JASMINE, a ſpecies of ipomæa. See the article IPOMÆA.

lex-leaved JASMINE, a plant otherwiſe called lantana. See LANTANA.

ndian JASMINE, a diſtinct genus of plants called by Linnæus nyctanthes.

ed JASMINE, plumeria, in botany. See the article PLUMERIA.

carlet JASMINE, the ſame with bignonia, or trumpet flower. See BIGNONIA.

JASPACHATES, a name given by the antients to a ſpecies of agate, from its being truly a compoſition of agate and the genuine matter of jaſper.

JASPER, in natural-hiſtory, a genus of ſcrupi, of a complex irregular ſtructure, of great variety of colours, and emulating the appearance of the finer marbles, or ſemipellucid gems.

The great characteriſtic of jaſpers is, that they all readily ſtrike fire with ſteel, and make not the leaſt efferveſcence with aquafortis.

Jaſpers, tho' commonly reckoned among the precious ſtones, ought undoubtedly to be ranged among the ſcrupi; being only opake cryſtalline maſſes, variouſly debaſed with an earthy admixture: and to this laſt ingredient it is that they owe all their variety of colours, as white, green, red, brown, and bluiſh.

The ſeveral kinds of nephritic ſtone, and the lapis divinus or jade, are all genuine jaſpers; but the hard, bright, green jaſper of the Eaſt Indies, ſeems to be the true medicinal kind. It is found in maſſes of various ſizes and ſhapes, but the more uſual ſtandard as to ſize, is between four and ſix inches in diameter; but there are maſſes of it found of a foot or more in diameter, and others no larger than a horſe-bean. It is generally ſimple and unmixed; but if it be variegated at all, it is always with white, and this is diſpoſed not in ſtreaks or veins, but in clouds. It is capable of a very fine poliſh, and when the white clouds are well diſpoſed, is very beautiful, and in pieces not too thick, is tolerably pellucid, when held up againſt the light.

It is recommended as an aſtringent, and ordered to be taken in powder againſt hæmorrhages of all kinds. The antients wore it as an amulet to prevent abortion, and tied it, on this occaſion, to the belly of the perſon; and they were of opinion that it was able to ſtop hæmorrhages by being only worn on the arm. At preſent we give no credit to any thing of this marvellous kind, and conſequently the virtues of this, as well as of the other ſemi-pellucid gems, is greatly out of repute.

JASPI CAMEA, in natural hiſtory, the dull, broad-zoned, green and white camea; being a very elegant ſpecies much reſembling the common camæa in all things but colour. See CAMÆA.

JASPONYX, in natural hiſtory, the pureſt horn-coloured onyx, with beautiful green zones, which are compoſed of the genuine matter of the fineſt jaſpers. See the articles JASPER and ONYX.

JASQUES, a port-town of Perſia, ſituated on the gulph of Ormus: eaſt long. 58°, north lat. 25°.

JATRALIPTA, or JATRALIPTES, in grecian antiquity, an officer of the gymnaſium, whoſe employment it was to anoint the athletæ.

JATRALIPTES is alſo an appellation given to phyſicians, who pretend to cure all diſeaſes by external unctions.

JATROPHA, the CASSADA-PLANT, in botany, a genus of the monoecia-polyandria claſs of plants, the male flower of which is monopetalous, and of a ſaucer or funnel-like ſhape, with a very ſhort tube, and the limb divided into five ſegments: the ſtamina are ten ſubulated filaments, alternately ſhorter: the female flower is roſaceous, conſiſting of five petals; and the fruit is a roundiſh, trilocular capſule, with a roundiſh ſeed in each cell. See the article CASSAVI.

JAVA, an iſland of the Eaſt Indies, ſituated between 102° and 113° of eaſt longitude, and between 5° and 8° of ſouth latitude; being about 700 miles long from eaſt to weſt, and one hundred broad.

JAVA *the leſs*, or BALLY, a ſmall iſland on the eaſt of Java Major, and ſeparated from it by a narrow channel.

JAVELIN, *haſta*, in antiquity, a ſort of ſpear, five feet and an half long; the ſhaft of which was of wood, with a ſteel point.

Every ſoldier, in the roman armies, had ſeven of theſe; which were very light and ſlender.

JAUNDICE, in medicine, a diſeaſe which is principally diſcovered by the yellow tincture of the ſkin, but moſt diſtinctly in the coats of the eyes, where it gives the firſt notice of its invaſion.

The ſymptoms, according to Sydenham, are heavineſs, inactivity, laſſitude of the whole body, anxiety, uneaſineſs about the hypochondria, ſickneſs at the ſtomach, oppreſſion in the breaſt, difficult reſpiration, a dry and harſh ſkin, coſtiveneſs, hard white excrements, yellow high-coloured urine, which will tincture linen or paper with a ſaffron hue: there is a bitter taſte in the mouth, and all objects ſeem to be diſcoloured.

The immediate cauſe of a jaundice, ſays Towne, is an obſtructed excretion of the bile from the veſica fellis and liver into the duodenum, which being forced back upon the liver, mixes with the blood, by which it is carried into the whole body, whence the ſkin and urine will be tinctured with the colour of the bile. See the articles BILE and LIVER.

This obſtruction may be occaſioned by any thing in the duct that plugs up the paſſage, or by external preſſure which cloſes its mouth; or by ſpaſms contracting the fibres thereof. Hence we may ſee why the jaundice ſucceeds the flatulent colic, why pregnant women are ſubject to it, and why ſpaſms of hypochondrical and hyſterical perſons produce the ſame effect. Sudden frights, the generation of two great plenty of bile, ſchirrous tumours, or ulcers of the liver, obſtructions of the menſes, obſtinate intermitting fevers, and the bites of venomous animals, will alſo produce this diſeaſe.

Hoffman thinks emetics highly proper in the cure of a jaundice, if the diſeaſe does not proceed from violent anger, ſpaſms of the ſtomach, a cardialgia, a ſpaſmodic colic, or a ſtone lodged in the cyſtic duct, exciting a violent uneaſineſs about the precordia; and that when a bilious ſordes lodging in the duodenum, and cloſing up the orifice of the ductus choledochus intercepts the paſſage of the bile, or when a tenacious, moveable, and not highly concreted bilious matter plugs up the hepatic ducts, emetics are of ſingular efficacy in evacuating it. A ſcruple of ipecacuanha, with a grain of tartar emetic, will be a proper doſe; or two grains of tartar emetic in a draught of generous wine, or in an infuſion of manna, drinking water-gruel after it.

In this caſe, Huxham, after emetics, thinks cathartics will be proper, compounded of aloetics and mercurials. Then ſaponaceous attenuants, preparations of tartar, and volatiles, and laſt of all chalybeats; but the laſt are not to be given till the humours are ſufficiently attenuated, otherwiſe an incurable ſchirrus of the liver may enſue. He alſo recommends the terra foliata, otherwiſe called tartarum regeneratum, and, by the college, ſal diureticus, as the greateſt diſſolvent and the moſt powerful remedy in this diſeaſe. Its doſe is from five grains to a ſcruple, and upwards.

Saponaceous medicines are often given with the ſame intention in this diſeaſe with ſucceſs, thus: take caſtle ſoap, three ounces; powder of the rhapontic plant, and ſpecies of hiera picra, of each half an ounce; as much of the ſyrup of orange peel as is ſufficient to make an electuary, of which the patient is to take from half a dram to a whole dram twice a day. After ſome time, with the above precaution, may be added half an ounce of ſteel-filings: or take gum ammoniac, two drams; powder of ſquills, one dram; caſtile ſoap, three drams; and a ſufficient quantity of white ſugar: make ten pills out of every dram, three of which are to be taken every morning, and as many at night going to bed.

Theſe are attenuants which ſhould be preceded with gentle purgatives; for Hoffman affirms, that all draſtic purgatives are prejudicial, as they encreaſe ſpaſms, throw the blood into violent commotions, and impair the ſtrength: therefore, beſides theſe which Huxham has directed above, the following formula may be ſometimes proper. Take of good rhapontic powder, half a dram; cream of tartar, one dram; ſimple cinnamon-water, three ounces, and ſyrup of roſes, two drams, for a draught. When a jaundice ſucceeds the colic, Sydenham is of opinion that all purgatives are to be omitted, rhubarb only excepted; and this is not to be preſcribed without evident reaſon: but if the jaundice comes on without any preceding colic, then the purgatives already mentioned may be given; and if the diſeaſe does not yield to this method, the doctor is of opinion that chalybeat waters will be proper.

In a ſtubborn jaundice, Allen recommends æthiops mineral.

When a jaundice is attended with a hæmorrhage, it is always dangerous in the opinion of Huxham, becauſe it denotes a moſt acrimonious and diſſolved ſtate of the blood; in which caſe he thinks attenuants, aloetics, volatiles, and chalybeats, little better than poiſon; whereas acids, diluents, demulcents, and mineral waters, are very beneficial. Hemp-ſeed boiled in milk till it breaks, is often advantageous: the doſe is five ounces twice a day. Or an emulſion of white poppy-ſeeds and ſweet almonds after moderate bleeding, if the patient is feveriſh, and the pulſe will allow it, and gentle purging.

Sylvius obſerves that many children are afflicted with this diſtemper ſoon after they are born, and that ſome are often born with it. It is his opinion, that this diſeaſe may often ariſe, without any obſtruction of the biliary duct.

The remedies, which cure the jaundice, are not ſo ſafely given to children as to adults; however, the following powder, given in the nurſe's milk twice or three times a day, ſeldom fails of curing this diſeaſe in children. Take engliſh ſaffron and bezoar mineral, of each one grain; and being beat to powder, let them be mixed. When the body is bound, the beſt purgative is rhubarb, and particularly the ſyrup of ſuccory with rhubarb.

JAW, *maxilla*, in anatomy. See the article MAXILLA.

In fractures of the lower jaw, after the patient is commodiouſly ſeated againſt the light, and his head held firm by an aſſiſtant, the ſurgeon is to introduce the thumb or fore-finger of one hand into his mouth, applying his other hand externally; and by this means, to preſs the fragments of the jaw on each ſide, till they have regained their former ſituation, which may be known by the regular diſpoſition of the teeth. When properly reduced, they muſt be covered internally firſt with a plaſter, and then a compreſs dipt in ſpirit of wine; and another compreſs, ſewed to a piece of paſte-board in the form of a half jaw, is to be laid on externally. Theſe are to be kept on by the bandage with four heads, perforated in the middle to let in the chin. But whenever the jaw is found to be fractured on both ſides, it is uſual to apply internally, after the compreſs dipt in ſpirit of wine, another made of thin paſte-board, perforated in the middle, and accommodated to the figure of the chin. The patient ſhould live upon broths and ſoops, and avoid all talking, till the jaw is grown firm; and at the ſame time take care not to lie flat either on the back or face.

The lower jaw is indeed ſeldom luxated, becauſe held very firm by ſtrong ligaments and muſcles; but when this happens, whether from a blow, or by opening the mouth too wide in yawning, the chin is diſtorted on the oppoſite ſide, and the mouth gapes open; and when luxated on both ſides, then the mouth not only gapes open, but the chin alſo hangs down. When the luxation is only on one ſide, the cure is uſually not ſo very difficult; but when both heads are diſlocated, and not properly reſtored to their places, it always occaſions the worſt of ſymptoms, as violent pains, inflammations, convulſions, fevers, vomitings, and at length death. But if an expert ſurgeon comes in time, the luxation is not very difficult to reduce.

When this happens, the patient is to be directly ſeated on a low ſtool, ſo that an aſſiſtant may hold his head firmly back againſt his breaſt; then the ſurgeon is to thruſt his two thumbs as far back into the patient's mouth as he well can; but they are to be firſt wrapped round in a handkerchief, to prevent them from ſlipping or being hurt; and his other fingers are to be applied to the jaw externally: when he has got firm hold of the jaw, it is to be ſtrongly preſſed, firſt downwards, then backwards, and laſtly upwards, but ſo as that all may be done in an inſtant, by which means the elapſed heads of the jaw may be eaſily ſhoved into their former cavities: but the ſurgeon ought to be always careful to ſnatch his thumbs quickly out of the patient's mouth, leſt they ſhould be compreſſed, bruiſed or bit, by reducing the jaw into its place.

If the jaw be out on one ſide only, every thing is to be done in the ſame manner; only obſerving that the luxated ſide is to be forced more ſtrongly downwards and backwards than the ſound one. As for bandages, there ſeems no great occaſion for them in this caſe, unleſs the luxation has remained ſome time before it was reduced; for then it may not be improper to apply, for ſeveral days, the four-headed bandage, with ſome ſtrengthening ſpirit, which may be taken off when the patient intends to eat.

JAWER, a city of Sileſia, capital of the dutchy of Jawer, ſituated in 16° 12′ eaſt long. and 51° 8′ north lat.

JAY, in ornithology, the variegated corvus, with the covering feathers of the wings blue, variegated with black and white. See the article CORVUS.

JAZY, a city of european Turky, capital of Moldavia, ſituated on the river Pruth, in eaſt long. 28° 40′, north lat. 47° 15′.

IBERIA, the antient name of Spain, as well as of Georgia in Aſia.

IBERIS, SCIATICA-CRESS, in botany, a genus of the tetradynamia-ſiliculoſa claſs of plants, the corolla whereof conſiſts of four unequal petals; vertically oval, obtuſe, and patent; the fruit is a little pod erect, roundiſh, compreſſed, ſurrounded by an acute bifid margin on the upper ſide, and containing two cells: the ſeed, in each cell, is ſingle and roundiſh.

IBEX, in zoology, an animal of the goat-kind, with extremely long nodoſe horns, which bend backwards, and are of a blackiſh colour, and annulated on the ſurface. The body is of a dark duſky colour, and is leſs in proportion to the height than that of the common goat: it has a great reſemblance to the deer-kind; the legs are alſo perfectly like thoſe of the deer, ſtraight, elegant, and ſlender. It is frequent in many parts of Europe, and, notwithſtanding its vaſt horns, runs and leaps with ſurpriſing force and agility. See plate CXLII. fig. 4.

IBIS, a bird which was very uſeful to the Egyptians for deſtroying ſerpents, locuſts, and caterpillars; and, on that account, had divine honours paid it.

It is all over black, and about the ſize of the curlew, with the head of a cormorant, and the long neck of a heron.

IBURG, a town of Weſtphalia, in Germany, twelve miles ſouth of Oſnaburg.

ICE, *glacies*, in phyſiology, a ſolid tranſparent, and brittle body, formed of ſome fluid, particularly water, by means of cold. See FROST and FREEZING.

The younger Lemery obſerves, that ice is only a re-eſtabliſhment of the parts of water in their natural ſtate; that the mere abſence of fire is ſufficient to account for this re-eſtabliſhment; and that the fluidity of water is a real fuſion, like that of metals expoſed to the fire; differing only in this, that a greater quantity of fire is neceſſary to the one than the other. Gallileo was the firſt that obſerved ice to be lighter than the water which compoſed it: and hence it happens, that ice floats upon water, its ſpecific gravity being to that of water as eight to nine. This rarefaction of ice is owing to the air bubbles produced in the water by freezing; and being conſiderably larger in proportion to the water frozen, render the body ſo much ſpecifically lighter: and theſe air-bubbles growing large, acquire a great expanſive power, ſo as to burſt the containing veſſels, though ever ſo ſtrong. It has been imagined, that this burſting of the veſſels by frozen water, was owing to the contraction of the ſolid parts of the veſſel upon the ice, and not to the internal expanſion: but the florentine academicians ſhewed the contrary by the following experiment: they filled a hollow globe of pure gold with cold water, then, ſoldering up the orifice, expoſed it to a freezing air; having firſt fitted to it a metallic ring, ſomewhat leſs than a great circle of the ſphere, and carefully marked the part of the ſphere where the edge of the ring touched it. While the water froze in the globe, they obſerved the external ſurface to be ſo much enlarged, that the metallic ring remarkably aſcended towards the vertex from the greateſt horizontal circle: whence the globe expanded much more than the ring contracted by the cold; as was plain from comparing this ring with another, originally made of the ſame ſize.

But ſnow-water, or any water long boiled at the fire, freezes ſlower, and affords a more ſolid ice, with fewer bubbles, than other water not ſo treated. And pure water long kept in vacuo, and froze afterwards there, freezes much ſooner with the ſame degree of cold, than water unpurged of air, and expoſed to the atmoſphere; whilſt ice is thus made of water from which the air was extracted, is much harder, more ponderous, equable, and tranſparent than common ice. Whence it is certain, that the air naturally contained in water, being brought together by the freezing cold, occaſions its greater rarefaction and levity: and in this manner ice has been procured, that would not float upon water. If finely powdered ſea-ſalt, ſal gem, or ſal ammoniac be put to powdered ice or ſnow, in a freezing ſeaſon, and they be well mixed together, the ſalts will immediately begin to diſſolve, and the coldneſs grow much more intenſe; and this, ſo far as we yet know, to a certain degree, whatever were the degrees of cold in the bodies before their mixture. Alcohol alſo being thus mixed with ice, increaſes its coldneſs: the pure, ſaline, and acid ſpirits of ſea-ſal, nitre, aqua fortis, and aqua regia, the ſtronger they are, the more intenſe cold they produce when mixed with ice.

Hence, to make the moſt perfect ice, we ſhould take the pureſt water, and perfectly purge it of air by the air-pump, and then freeze it in the ſevereſt froſt: thus we ſhall obtain ice of the greateſt hardneſs, denſity, purity, tranſparency, and gravity; the true phyſical characters of ice to the ſenſes: tho' even this ice, ſo far as we now know, would immediately melt into water with a heat of thirty degrees. Whence it follows, that the moſt natural cold cannot convert pure water into ſtone, cryſtal, or gems; for this artificial cold is above forty degrees ſtronger than that, where water is ſaid to be frozen into rock-cryſtal: for by all the experiments that have been made, no increaſe of cold has made ice at all more difficult to melt than common ice.

ICE-HOUSE, a building contrived to preſerve ice for the uſe of a family in the ſummer-ſeaſon.

Ice-houſes are more generally uſed in warm countries, than with us, particularly in Italy, where the meaneſt perſon who rents a houſe, has his vault or cellar for ice. However, as ice is much more uſed in England than it was formerly, it may not be amiſs to give ſome directions for the choice of their ſituation, for the manner of building them, and for the management of the ice.

As to the ſituation, it ought to be placed upon a dry ſpot of ground; becauſe wherever there is moiſture, the ice will melt: therefore in all ſtrong lands which retain the wet, too much pains cannot be taken to make drains all round them. The place ſhould alſo be elevated, and as much expoſed to the ſun and air as poſſible.

As to the figure of the building, that may be according to the fancy of the owner; but a circular form is moſt proper for the well in which the ice is to be preſerved; which ſhould be of a ſize and depth proportionable to the quantity to be kept; for it is proper to have it large enough to contain ice for two years conſumption, ſo that if a mild winter ſhould happen, in which little or no ice is to be had, there may be a ſtock to ſupply the want. At the bottom of the well there ſhould be a ſpace of about two feet deep left to receive any moiſture that may drain from the ice; over this ſpace ſhould be placed a ſtrong wooden grate, and from thence a ſmall drain ſhould be laid under ground, to carry off the wet. The ſides of the well ſhould be built with brick, at leaſt two bricks thick; for the thicker it is, the leſs danger there will be of the well being affected by any external cauſe. When the well is brought up within three feet of the ſurface, there ſhould be another outer-arch or wall begun, which ſhould be carried up to the height of the top of the intended arch of the well; and if there be a ſecond arch turned over this wall, it will add to the goodneſs of the houſe: the roof muſt be high enough above the inner arch to admit of a doorway to get out the ice. If the building is to be covered with ſlates or tiles, reeds ſhould be laid conſiderably thick under them, to keep out the ſun and external air;

air; and if theſe reeds are laid the thickneſs of ſix or eight inches, and plaiſtered over with lime and hair, there will be no danger of the heat getting thro' them. The external wall may be built in what form the proprietor pleaſes; and as theſe ice-houſes are placed in gardens, they are ſometimes ſo contrived as to have an handſome alcove-ſeat in front, with a ſmall door behind it, through which a perſon might enter to take out the ice; and a large door on the other ſide, fronting the north, with a porch wide enough for a ſmall cart to back in, in order to ſhoot down the ice near the mouth of the well, which need not be more than two feet diameter, and a ſtone ſo contrived as to ſhut it up in the exacteſt manner: all the vacant ſpace above and between this and the large door ſhould be filled up with barley-ſtraw. The building thus finiſhed, ſhould have time to dry before the ice is put into it.

It is to be obſerved that upon the wooden grate, at the bottom of the well, there ſhould be laid ſome ſmall faggots, and if upon theſe a layer of reeds is placed ſmooth for the ice to lie upon, it will be better than ſtraw, which is commonly uſed. As to the choice of the ice, the thinner it is, the eaſier it may be broken to powder; for the ſmaller it is broken, the better it will unite when put into the well. In putting it in, care muſt be taken to ram it as cloſe as poſſible; and alſo to allow a vacancy of about two inches, all round, next the ſide of the well, to give paſſage to any moiſture occaſioned by the melting of ſome of the ice. When the ice is put into the well, if a little ſalt-petre be mixed with it at every ten inches or a foot in thickneſs, it will cauſe it to unite more cloſely into a ſolid maſs.

ICH DIEN, the motto of the prince of Wales's arms, ſignifying, in the high dutch, *I ſerve.*

It was firſt uſed by Edward the black prince, to ſhew his ſubjection to his father king Edward III.

ICHNEUMON, in zoology, the name of the bluiſh meles, with uniform claws. See the article MELES.

This animal is truly of the badger-kind, and indeed very much reſembles the common badger in almoſt every particular. It is about the ſize of a large cat; the head is of a blue colour, approaching to black, eſpecially about the noſe; and all the reſt of the body is of a grey colour, like that of our common badger, the under part being darker than the back or ſides.

ICHNEUMON is alſo the name of a genus of flies, of the hymenoptera order, with a triple ſting at the anus.

ICHNOGRAPHY, in perſpective, the view of any thing cut off by a plane parallel to the horizon, juſt at the baſe of it.

Among painters it ſignifies a deſcription of images, or of antient ſtatues of marble and copper, of buſts and ſemi-buſts, of paintings in freſco, moſaic works, and antient pieces of miniature.

ICHNOGRAPHY, in architecture, a deſcription or draught of the platform or groundwork of a houſe, or other building. Or it is the geometrical plan or platform of an edifice or houſe, or the ground-work of an houſe or building, delineated upon paper, deſcribing the form of the ſeveral apartments, rooms, windows, chimnies, &c. See the article BUILDING.

The drawing or deſigning of this is properly the buſineſs of the maſter architect, or ſurveyor; it being, indeed, the moſt difficult of any.

ICHNOGRAPHY, in fortification, denotes the plan or repreſentation of the length and breadth of a fortreſs, the diſtinct parts of which are marked out, either on the ground itſelf, or on paper.

ICHOGLANS, the grand ſignior's pages, ſerving in the ſeraglio.

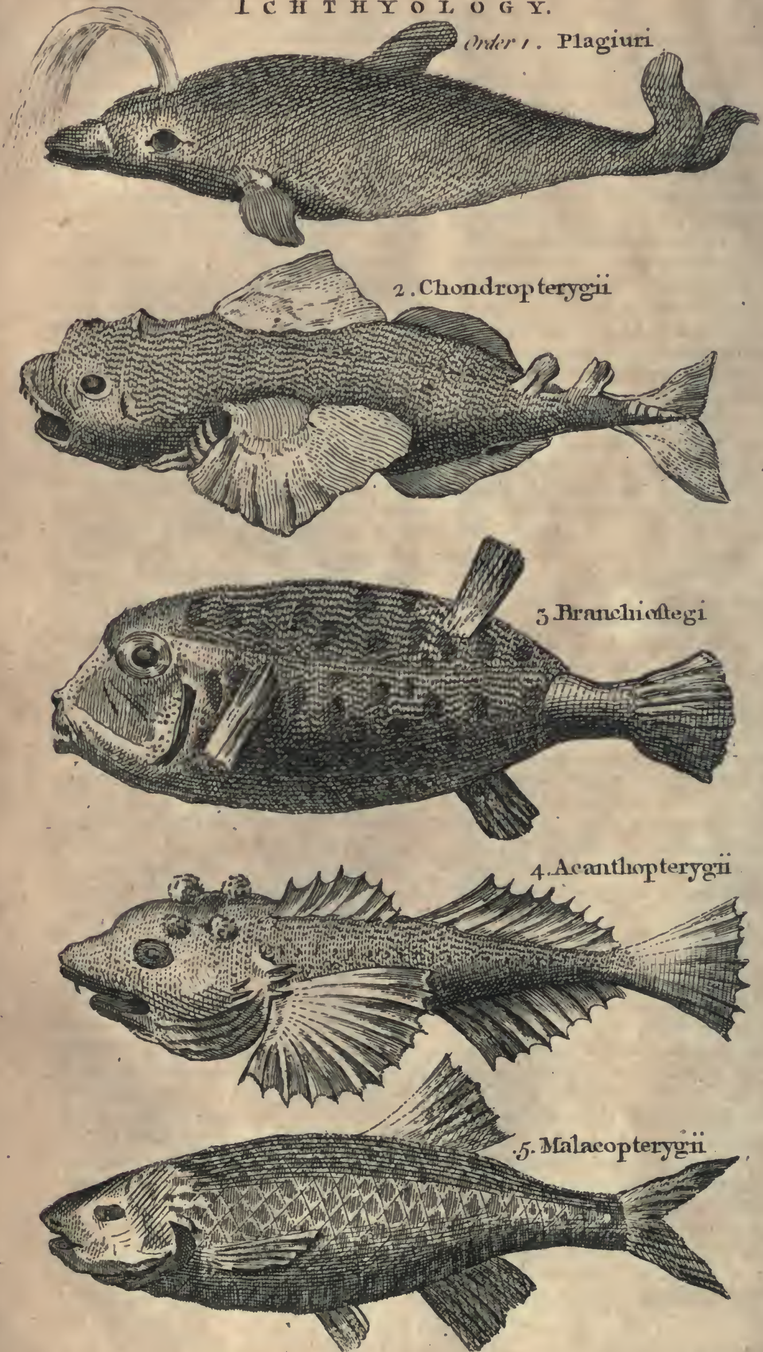
Thoſe are the children of chriſtian parents, either taken in war, purchaſed, or preſents from the viceroys and governors of diſtant provinces: they are the moſt ſprightly, beautiful, and well made that can be met with; and are always reviewed and approved of by the grand ſignior himſelf, before they are admitted into the ſeraglios of Pera, Conſtantinople, or Adrianople, being the three colleges where they are educated, or fitted for employments, according to the opinion the court entertains of them.

ICHOR, properly ſignifies a thin watry humour, like ſerum: but is ſometimes alſo uſed for a thicker kind, flowing from ulcers, called alſo ſanies.

ICHTHYOCOLLA, ISINGLASS, in the materia medica, &c. a preparation from the fiſh known by the name of huſo. See the article HUSO.

This is a tough and firm ſubſtance, of a whitiſh colour, and in ſome degree tranſparent; it is light, moderately hard, very flexile, and of ſcarce any ſmell, and very little taſte. We uſually receive it in twiſted pieces of an oblong and rounded figure,

ICHTHYOLOGY.



J. Jefferys sculp

figure, and bent in the ſhape of a horſeſhoe: this our druggiſts uſually beat and pull to pieces, and ſell it in thin ſhreds like ſkins, which eaſily diſſolve: beſides this kind of round iſinglaſs, we meet with ſome in ſmall thin ſquare cakes, white and very tranſparent; theſe are the fineſt of all. But iſinglaſs, of whatever ſhape, is to be choſen clean, whitiſh, and pellucid.

The method of preparing the ichthyocolla is this: they cut off all the fins of the huſo, cloſe to the fleſh, and take out the bladder, ſtomach, and inteſtines; they waſh theſe very clean, and then cut them in pieces, and throwing them into a large quantity of water, they let them ſteep four and twenty hours, and after this they kindle a fire under the veſſel, and keep the liquor juſt boiling till the greater part of the matters are diſſolved; they then ſtir the whole briſkly about; then ſtrain it through flannels, and ſet the liquor by to cool. When there is a large quantity of fat uſually formed upon it, which is carefully ſkimmed off, and the clear liquor is poured off from the groſſer parts which ſubſide, it is put over the fire again, and gently evaporated and ſkimmed afreſh, all the time, till by trials they find, that, on letting a ſpoonful of it cool, it will harden into the conſiſtence of glue. Great care is taken to keep the fire very gentle, to prevent burning towards the end of this evaporation. They then pour it out upon a large, ſmooth, wooden table; and as it cools, form it into the maſſes we meet with it in, by cutting and rolling it up.

The greateſt quantity of iſinglaſs is made in Ruſſia. We have it principally from Holland, the Dutch contracting for the moſt of it, before it is made.

It is an excellent agglutinant and ſtrengthener, and is often preſcribed in jellies and broth, but rarely enters any compoſitions of the regular medicinal form. It is the moſt efficacious as well as the moſt ſafe and innocent of all the ingredients uſed for cleaning wines, upon which account the wine-coopers uſe a much greater quantity of it than the apothecaries.

A very valuable glue is alſo made of this drug, which is a proper form to keep it for the wine-coopers uſe.

ICHTHYOLOGY, ιχθυολογια, the ſcience of fiſhes, or that branch of zoology which treats of fiſhes. See the article FISH. Artedi defines ichthyology to be the ſcience or art of diſtinguiſhing all the parts of fiſhes, and calling them by their proper names; alſo of giving every fiſh its generical and ſpecific name; and laſtly, to commemorate ſome of its remarkable qualities. See plate CXLIII.

We have already, under the article FISH, given the general diſtribution of fiſhes into the claſſes of plagiuri, chondropterygious, branchioſtegious, acanthopterygious, and malacopterygious fiſhes, with the peculiar characters of each claſs; and in the annexed plate of Ichthyology, there is delineated a fiſh of each claſs, in the order above mentioned.

As to the plagiuri, or cetaceous fiſhes, they agree in many particulars with hairy quadrupeds, and are diſtinguiſhed into genera by much the ſame characters, eſpecially the teeth; but beſides theſe, the number of fins is alſo of uſe in arranging them into diſtinct genera.

The chondropterygious or cartilaginous fiſhes differ from each other in the figure of their whole body, the number of foramina or apertures of the gills, &c. by which they are moſt commodiouſly ſubdivided into genera; ſince the characters of the firſt claſs are here ſo various as to differ in the different ſpecies of the ſame genus. The characters by which theſe two claſſes of fiſhes may be ſubdivided into diſtinct genera, are ſimple and obvious; but it is a matter of greater difficulty to fix upon invariable characters, by which the other claſſes may be ſubdivided in the ſame manner. The multitude of genera contained under each of them, added to the great reſemblance to be found between really diſtinct genera, make it no eaſy taſk to diſtinguiſh theſe genera from each other, which is beſt done by eſtabliſhing the generical characters upon ſuch external parts as are moſt conſtant and uniform in the ſame genus, and leaſt common to other genera. From many inſtances produced by Artedi, it appears, 1. That the figure of the fins and tail is of no uſe in determining the genera of theſe fiſhes. 2. That the figure of the back, breaſt, and belly, and even of the whole body, with reſpect to length and breadth, is of no ſervice for eſtabliſhing generical diſtinctions. 3. That the figure of the head, mouth, eyes, noſtrils, and other parts belonging to the head, is indeed of the utmoſt conſequence in diſtinguiſhing the different genera; but as this figure is common to ſeveral otherwiſe diſtinct genera, it is rather ſerviceable in eſtabliſhing the orders, than genera of fiſhes. 4. The ſame may be obſerved of the figure of the ſcales, and the ſituation of the ſeveral external parts of fiſhes, as the mouth, noſtrils, eyes, fins, &c. theſe, though of great uſe in the deſcription of fiſhes, afford no diſtinctive characters of the genera, as being common to ſeveral. 5. Neither is the number of fins or teeth to be reckoned a generical character; ſince this varies in fiſhes undoubtedly of the ſame genus.

Having thus ſhewn what properties of fiſhes are not, he next conſiders thoſe which are ſufficient generical characters; and obſerves, that of all the external parts, the only ones to be found in all the ſpinoſe fiſhes, and yet different in each genus, are the little bones of the membrana branchioſtega, or membrane of the gills. Theſe bones are found in almoſt all fiſhes that have bones, though more conſpicuous in ſome than in others, by reaſon of the different thickneſs of the membrane; and the number of them is more conſtant in the ſame genus, than that of the fins: thus, all the gadi have conſtantly ſeven of theſe little bones in the branchioſtege membrane of each ſide; all the ſpecies of pearch have likewiſe ſeven; the cyprini, three; the cotti, ſix; the clupeæ, eight; the eſoces, fourteen; and ſo of others. There are only two known genera of ſpinoſe fiſh, wherein the number of theſe bones is not the ſame in all the ſpecies of the ſame genus, *viz.* the ſalmon and coregonus; theſe bones in different ſpecies of ſalmons being ten, eleven, and twelve; and in the different ſpecies of coregonus, ſeven, eight, nine, and ten: and it is very remarkable, that this difference only takes place in fiſhes, the ſpecies of which are ſo very like each other, as to be known to belong to the ſame genus at firſt ſight.

Hence it follows, that the number of theſe little bones in the branchioſtege membrane affords the firſt and moſt eſſential character for diſtinguiſhing the genera of catheturous and oſteopterygious fiſhes. This however is not ſufficient alone; it being alſo neceſſary, beſides the ſame number of theſe bones in the membrane of the gills, 1. That the fiſhes belonging to each genus, ſhould have the ſame external figure. 2. That the ſituation, no leſs than the number of their fins, be the ſame. 3. The teeth ſhould alſo have the ſame ſituation. 4. The diſpoſition of the ſcales ſhould alſo be the ſame. 5. The figure and diſpoſition of the other external and internal parts, particularly of the ſtomach and its appendices, the inteſtines, air-bladder, &c. ſhould alſo agree.

If theſe characters are found to correſpond, there can be no doubt but the genus founded on them is juſt and natural. However, it muſt be obſerved, that theſe characters are not to be expected in full perfection in all the fiſhes belonging to one and the ſame genus. But three of theſe, *viz.* the ſame number of bones in the branchioſtege membrane, the ſame external figure, and the ſame diſpoſition of the fins, are eſſential to the ſameneſs of the genus; the other characters being only additional to theſe.

ICHTHYOLOGIST, an author who has written profeſſedly of fiſhes.

Ichthyologiſts are very numerous; bu those who have treated this ſubject wit moſt accuracy and judgment, are Ariſtotle, Bellonius, Rondeletius, Salvian Geſner, Willughby, Ray, and Artedi eſpecially this laſt author, who is univerſally acknowledged to be the beſt on thi ſubject; and next to him come Willughby and Ray.

ICHTHYPERIA, in natural hiſtory, a name given by Dr. Hill to the bony palates and mouths of fiſhes, uſually met wit either foſſile, in ſingle pieces, or in frag ments. They are of the ſame ſubſtanc with the bufonitæ, and are of very va rious figures, ſome broad and ſhort, other longer and ſlender; ſome very gibboſe and others plainly arched. They are likewiſe of various ſizes, from the tenth of a inch to two inches in length, and an inc in breadth. See BUFONITÆ.

ICHTHYS, ιχθυς, in antiquity, a celebrated acroſtic of the erythræan ſibyl, th firſt words of each verſe of which were Ιησȣ Χριϛος Θεȣ υἱος σωτὴρ, that is, *Jeſu Chriſtus Dei filius ſervator*; and the ini tial greek letters form the word ιχθυς whence the name.

ICKWORTH, a town of Suffolk, ſix miles eaſt of St. Edmundſbury.

ICONIUM, the ſame with Cogni. See the article COGNI.

ICONOCLASTS, εικονοκλαϛαι, in church-hiſtory, an appellation given to thoſe perſons, who, in the VIIIth century, oppoſed image-worſhip; and is ſtill given by the church of Rome, to all chriſtians who reject the uſe of images in religious matters. See the article IMAGE.

ICOSAHEDRON, in geometry, a regu la

lar ſolid, conſiſting of twenty triangular pyramids, whoſe vertexes meet in the center of a ſphere, ſuppoſed to circumſcribe it; and, therefore, have their height and baſes equal: wherefore the ſolidity of one of thoſe pyramids multiplied by 20, the number of baſes, gives the ſolid content of the icoſahedron.

If fig. 1. n° 1. plate CXLIV. be nicely drawn on paſteboard, cut half through, and then folded up neatly together, it will repreſent an icoſahedron. *ibid.* n° 2.

ICOSANDRIA, in the linnæan ſyſtem of botany, a claſs of plants, the twelfth in order, the characters of which, in ſo far as it differs from the polyandria, are theſe; the cup of the flower is monophyllous and hollow, with the corolla affixed by the ungues to its ſides, and about twenty ſtamina inſerted either into the ſide of the cup, or corolla. See the article BOTANY.

The term icoſandria is here taken in a lax and indeterminate ſenſe, ſo as to comprehend all plants with more than twelve ſtamina, and for the moſt part not much exceeding twenty. However, the characteriſtic of the claſs is rather to be taken from the manner of inſertion, than number of the ſtamina.

To this claſs belong the cactus or torch-thiſtle, the amygdalus or almond-tree, the ceraſus, or cherry, *&c.* See the articles CACTUS, ALMOND, *&c.*

CTERIC DISEASE, the ſame with the jaundice. See the article JAUNDICE.

CTIAR, in the turkiſh affairs, an officer who has gone through all the degrees of preferment in his reſpective body, and conſequently has a right to a ſeat in the divan. See the article DIVAN.

DA, a mountain in the iſland of Candia or Crete; alſo another in Natolia, or leſſer Aſia, celebrated by the poets for the judgment of Paris on the beauty of the three goddeſſes, Minerva, Juno, and Venus, to the laſt of whom he gave the preference.

DANHA VELHA, a city of Portugal, in the province of Eſtremadura, forty-ſix miles north eaſt of Portalegre.

DEA, in general, the image or reſemblance of a thing, which, though not ſeen, is conceived by the mind. See the article IMAGE.

In logic, idea denotes the immediate object about which the mind is employed, when we perceive or think of any thing.

To account for the formation of our ideas, it is obvious, that the firſt thing we perceive, in taking a view of what paſſes within us, is, that we receive impreſſions from a variety of external objects; that diſtinct notices are thereby conveyed into the underſtanding, and that we are conſcious of their being there. This attention of the mind to the object's acting upon it, is by logicians called ſimple apprehenſion. It is therefore by this means that we come to be furniſhed with all thoſe ideas about which our thoughts are employed. For when we look at the ſun, moon, a man, a tree, or any other object without us, the image or appearance thereof is immediately conveyed to the ſoul by the organ of ſight; and theſe images the mind has a power or faculty of renewing or calling up again to its view at pleaſure, even when the objects that firſt produced them are removed. Now our ideas are nothing elſe than theſe renewed repreſentations of what we have at any time perceived or felt, by means of which things are again brought under the view of the mind; and by variouſly combining theſe ideas together, the mind can upon many occaſions form to itſelf repreſentations even of things that never perhaps had any real exiſtence in nature, as mountains of gold, *&c.*

As to the origin or ſource of our ideas, it is to be obſerved, that they all have their firſt riſe, and are derived into the underſtanding, either from the ſenſes, or reflecting upon what paſſes within ourſelves; or, to ſpeak in the language of logicians, from ſenſation or reflection. From theſe two great inlets of knowledge the underſtanding is ſupplied with all the materials of thinking. For outward objects acting upon our ſenſes, rouze in us a variety of perceptions, according to the different manner in which they affect us; and it is thus that we come by the ideas of light and darkneſs, heat and cold, ſweet and bitter, rough and ſmooth, and all other impreſſions which are termed ſenſible qualities, and which are wholly derived to us from without, and are as numerous as the outward objects that produced them, and the different ways in which our ſenſes are affected by them. This inlet to knowledge, as comprehending all the notices conveyed into the mind by the impulſes of external objects upon the organs of ſenſe, is called ſenſation. But there is yet another ſource of impreſſions ariſing from the attention of the mind to its own acts, when it takes a view of the perceptions lodged there, that were originally furniſhed by the ſenſes. For theſe giving the mind an opportunity of exerting its ſeveral powers, when we turn the eye of the ſoul inwards upon them, and take a view of the various ways in which it employs itſelf about them, we find all our thoughts, under whatever form they appear, are attended with conſciouſneſs, and that the underſtanding is enriched with a new ſet of perceptions no leſs diſtinct than thoſe conveyed in by the ſenſes. It is thus that we come by the ideas of perceiving, thinking, doubting, remembering, willing, *&c.* which are the different acts and workings of the mind itſelf, repreſented to us by our own conſciouſneſs of what paſſeth within us. This ſecond ſource of ideas is called reflection, and preſuppoſes ſenſation. Beſides theſe two ſources there are other ideas derived into our underſtandings by all the ways of ſenſation and reflection, as the ideas of pleaſure, pain, power, exiſtence, unity, ſucceſſion, *&c.* See SENSATION and REFLECTION.

From theſe ſimple beginnings, all our knowledge, all our diſcoveries, take their riſe: for we can have no perception of the operations of our minds, until they are exerted; nor can they be exerted before the underſtanding is furniſhed by the ſenſes with the ideas about which to employ them; as therefore theſe ideas that give the firſt employment to our faculties are evidently the perceptions of ſenſe, it is plain that all our knowledge muſt begin here. Nor ſhall we among all our diſcoveries, or that infinite variety of conceptions whereof they conſiſt, be able to point out one original idea, which is not derived from ſenſation or reflection, or one complex idea that is not made up of thoſe original ones. This will appear more obvious, if it is conſidered, that to ſuch as are deſtitute of any of the inlets by which the perceptions of ſenſe are uſually admitted, all the ideas thence ariſing are abſolutely loſt; for a blind man can have no idea of light or colours, nor a deaf man form any conception of ſound; and the ſame may be ſaid of the other ſenſes. Hence it follows, that the mind in the reception of all ideas by ſenſation is wholly paſſive, and the perceptions produced correſpond to the impreſſions made upon it, are juſt as nature furniſhed them, and have no dependance on our will. For when we ſee a tree, a houſe, a man, or any other object, they neceſſarily appear each under its proper form, nor is it in our power to receive from them other ideas than they are fitted to produce.

In tracing the progreſs of the mind further, we find by experience, that being thus provided with its original characters and notices of things, it has a power of combining, modifying, comparing and examining them in an infinite variety of lights; by which means it is enabled to enlarge the objects of its perception, and thereby to acquire an inexhauſtable treaſure of other ideas, diſtinct from the former, though reſulting from them; and by the various compariſon of its ideas according to ſuch combinations of them as beſt ſuits its ends, to exert itſelf in acts of judging and reaſoning, and to puſh on its views of things from one diſcovery to another; and thus we ſee the progreſs of the ſoul in its advances to knowledge from the firſt dawnings of perception. See KNOWLEDGE.

Ideas are variouſly divided by logicians, but the moſt natural as well as moſt uſeful diviſion of them is into ſimple and complex ideas; as this diviſion not only comprehends our ideas in all their varieties, but ſuggeſts and repreſents to us the manner and order in which they are introduced into the mind.

Simple ideas, are ſuch of our perceptions, or original notices of things, as are conveyed into or exiſt in the mind under one uniform appearance, without variety or compoſition, and are not diſtinguiſhable into different ideas. Under this head are included all thoſe ideas that come into the mind by ſenſation; for tho' external objects convey at once into the underſtanding many different ideas all united together, and making as it were one whole, and tho' the qualities of bodies that affect our ſenſes are in the things themſelves ſo mixed and united, that there is no ſeparation between them; yet the ideas they produce in the mind are ſimple and unmixed, and are conceived each under a form peculiar to itſelf, which cannot be divided into two or more different ideas. Thus the ideas of colour, extenſion and motion, may be taken in at one and the ſame time, from the ſame body; yet theſe three perceptions are as diſtinct in themſelves, as if all proceeded from different objects, or were exhibited to our notice at different times. Again, ſome of our ſimple ideas we acquire purely by means of one ſenſe; as the ideas of colours and ſounds, by the eyes and ears; of taſtes and ſmells, by the palate and noſe; rough and ſmooth, by the touch: others we gain by ſeveral ſenſes, as ſpace, extenſion, figure, *&c.* others again of our ſimple ideas are ſuggeſted to us by the attention of the mind to what paſſeth within itſelf, or reflection only, as our ideas of conſciouſneſs, perception, volition; others by ſenſation and reflection jointly, as thoſe of pain, pleaſure, power, exiſtence, unity, *&c.*

Of ſimple ideas, it is proper to obſerve, 1. That they are ſuch as can only be conveyed into the mind, by the proper channels or avenues provided by nature for that purpoſe. 2. That many of our ſimple ideas are not images or reſemblances of any thing inherent in the objects that produced them, as is uſually thought. In order to comprehend this aright, we muſt diſtinguiſh between the primary and ſecondary qualities of bodies that produce theſe ideas. Primary qualities are ſuch as are inſeparable from the body in what ſtate ſoever it be, and ſuch as our ſenſes conſtantly find in every particle of matter, as ſolidity, extenſion, figure, *&c.* Secondary qualities are ſuch as are, in reality, nothing in the objects themſelves, but only powers to produce various ſenſations in us by means of their primary qualities, that is, by the figure, bulk, texture, *&c.* of their particles, as colours, ſounds, taſte, ſmell, *&c.*—Now the ideas of primary qualities are in ſome ſenſe reſemblances of them, and their patterns do really exiſt in the bodies themſelves; but the ideas produced in us by thoſe ſecondary qualities, have no reſemblance of them at all; for there is nothing like our ideas exiſting in the bodies themſelves that occaſion them; and what we call blue, red, ſweet, hot, *&c.* are in the bodies we denominate from them, no other than a power to produce theſe ſenſations in us.

Complex ideas, are thoſe notions or conceptions of things that reſult from the various combinations and union of our ſimple ideas. Theſe are of two principal kinds, namely, ſuch as are derived from without, and repreſent thoſe combinations of ſimple ideas, that have a real exiſtence in nature, and are conceived to coexiſt in any particular ſubject without us; and ſuch as are formed by the mind itſelf, arbitrarily uniting and putting together its ideas. Of the firſt kind are all our ideas of particular ſubſtances, as gold, ſilver, iron, a tree, a man, a horſe, *&c.* in which the confuſed idea of ſubſtance, ſuch as it is, is always the chief. And it is to be obſerved, that the mind in the reception of theſe, as well as of ſimple ideas, is wholly paſſive. Of the ſecond kind of complex ideas are all thoſe arbitrary collections of different ideas, which the mind by its own powers occaſionally puts together, by compounding, comparing, diverſifying and uniting its original notices, either for uſe in the commerce of life, or in its purſuit for further knowledge; ſuch are our ideas of ſtated lengths, whether of duration or ſpace, of numbers, and of many human actions; of which it is to be obſerved, that they are manifeſtly the creatures of the mind: for as in the perception of our other ideas, the mind was paſſive; in the formation of theſe, it is active.

This laſt claſs of our complex ideas, may again be ſubdivided, according to the different acts of the mind exerted in framing them, into compound ideas, abſtract ideas, and ideas of relations.

Compound idea, is an aſſemblage of many ſimple ideas united together by the mind, and conſidered by it as one picture or repreſentation, and theſe may be conſidered as of two kinds. 1. Such as are only variations, or different combinations of the ſame ſimple idea without the mixture of any other, as a dozen, a ſcore, which are no more than different aſſemblages of ſo many units, *&c.* 2. Such as are compounded of ſimple ideas of ſeveral ſorts put together to make one complex one, as beauty, ingratitude, treaſon, *&c.* See MODE.

Abſtract or general idea, the idea of ſome general quality, or property conſidered ſimply in itſelf, without any reſpect to a particular ſubject. Abſtract ideas are formed by the mind by ſeparating from any of its conceptions, all thoſe circumſtances that render it particular, or the repreſentative of any ſimple determinate object: by which means, ideas taken from particular things become general, and in place of ſtanding for individuals, are each made to denote or repreſent a whole claſs of things. Thus, for inſtance, upon ſeeing a triangle, or circle, the mind by leaving out the conſideration of their particular dimenſion, and every thing elſe peculiar to them as they immediately affect the ſight, and retaining only the notion of what is common to all triangles or circles, ſuch as their figure or ſhape, formeth a general or abſtract idea applicable to every triangle or circle. And the mind proceeding ſtill farther by excluding the conſideration of their particular configuration, and whatever is peculiar to them, as figures of a particular form, and retaining only the notion of what is common to all geometrical figures, formeth an idea that is ſtill more abſtracted or general, applicable to every geometrical figure whatever.

In the ſame manner does the mind form the notion of whiteneſs in general, by leaving out the conſideration of ſnow, milk, and every particular ſubſtance from which we have at any time received that idea. See the articles ABSTRACT *idea*, ABSTRACTION and GENERAL TERMS.

Ideas of relations are a kind of complex ideas ariſing from the conſideration or compariſon of one idea with another, by examining their mutual reſpects, connections, and coreſpondencies. It is thus that we acquire the ideas of greater and leſs, older and younger, father and ſon, ſuperior and inferior, and innumerable others. See RELATION.

Ideas are alſo divided by logicians into adequate and inadequate, clear and obſcure, real and fantaſtical.

Adequate ideas are ſuch as perfectly repreſent thoſe arch-types that the mind ſuppoſes them taken from, in all their parts and properties. The idea of a circle, which repreſents it as a round figure bounded by a curve line, whoſe parts are all equally diſtant from a point in the center, is an adequate idea thereof.

Inadequate ideas are ſuch as do but partially, or imperfectly, repreſent thoſe arch-types to which they are referred. See the article ADEQUATE, *&c.*

Clear or diſtinct ideas are ſuch as repreſent the objects to us ſo, as that when they occur to us again, we can not only readily know them, but eaſily diſtinguiſh them from all others; the contrary whereof is what are called obſcure or confuſed ideas. For inſtance, the moſt illiterate, upon ſeeing the ſun or moon, have ſo clear an idea of them, as eaſily to know and diſtinguiſh them again from any other planet or fixed ſtar; but have not ſo diſtinct or clear an idea of jupiter, mars, or the other planets when once pointed out to them, as to know them again from one another, or from the fixed ſtars.

Real ideas are ſuch as have a foundation in nature, or a conformity with the real being or exiſtence of things.

Fantaſtical ideas are ſuch as have no foundation in nature, or a conformity with the real being or exiſtence of things, nor any arch-types to which they have a conformity.

IDENTITATE NOMINIS, in law, a writ that lies where a perſon is impriſoned inſtead of another of the ſame name, commanding the ſheriff to enquire whether the priſoner be the perſon, againſt whom the action was brought, or not; and if not, to diſcharge him.

IDENTITY, SAMENESS, denotes that by which a thing is itſelf, and not any thing elſe; in which ſenſe, identity differs from ſimilitude as well as diverſity. The idea of identity we owe to that power which the mind has of comparing the very being and exiſtence of things, whereby conſidering any thing as exiſting at any certain time and place, and comparing it with itſelf as exiſting at any other time and place, we accordingly pronounce it the ſame, or different. Thus when we ſee a man at any time and place, and compare him with himſelf when we ſee him again at any other time or place, we pronounce him to be the ſame we ſaw before. See the article SIMILITUDE and DIVERSITY.

To underſtand identity aright, we ought to conſider the eſſence and exiſtence, and the ideas theſe words ſtand for; it being one thing to be the ſame ſubſtance; another, the ſame man; and a third, the ſame perſon. For, ſuppoſe an atom exiſting at a determined time and place, it is the ſame with itſelf, and will continue ſo to be at any other inſtant as long as its exiſtence continues; and the ſame may be ſaid of two or any number of atoms, whilſt they continue together; the maſs will be the ſame; but if one atom be taken away, it is not the ſame maſs. In animated beings it is otherwiſe, for the identity does not depend on the coheſion of its conſtituent particles, any how united in one maſs; but on ſuch a diſpoſition and organization of parts, as is fit to receive and diſtribute life and nouriſhment to the whole frame. Man therefore, who hath ſuch an organization of parts partaking of one common life, continues to be the ſame man, tho' that life be communicated to new ſucceeding particles of matter vitaly united to the ſame organized body; and in this conſiſts the identity of man, conſidered as an animal only. But perſonal identity, or the ſameneſs of an intelligent being, conſiſts in a continued conſciouſneſs of its being a thinking being, endowed with reaſon and reflection, capable of pain or pleaſure, happineſs or miſery, that conſiders itſelf the ſame thing in different times and places. By this conſciouſneſs every one is to himſelf, what he calls *ſelf*, without conſidering, whether that *ſelf* be continued in the ſame or divers ſubſtances; and ſo far as this conſciouſneſs extends backward to any paſt action, or thought, ſo far extends the identity of that perſon, and makes it the object of reward and puniſhment. Hence it follows, that if the conſciouſneſs went with the hand, or any other limb when ſevered from the body, it would be the ſame ſelf that was juſt before concerned for the whole. And if it were poſſible for the ſame man to have a diſtinct incommunicable conſciouſneſs at different times, he would without doubt at different times make different perſons; which we ſee is the ſenſe of mankind as to madmen, for human laws do not puniſh the madman for the ſober man's actions, nor the ſober man for what the madman did, thereby conſidering them as two perſons.

IDEOT, or IDIOT. See IDIOT.

IDES, *idus*, in the antient roman calendar, were eight days in each month; the firſt of which fell on the 15th of March, May, July, and October; and on the 13th day of the other months.

They were reckoned backwards, in the manner already explained under the article CALENDS.

Thus they called the 14th day of March, May, July and October; and the 12th of the other months, the *pridie idus*, or the day before the ides; the next preceding day, they called the *tertio idus*; and ſo on, reckoning always backwards, till they came to the nones. See NONES. This method of reckoning time is ſtill retained in the chancery of Rome, and in the calendar of the breviary.

IDIOM, ιδιωμα, among grammarians, properly ſignifies the peculiar genius of each language, but is often uſed in a ſynonymous ſenſe with dialect. See the articles LANGUAGE and DIALECT.

IDIOPATHY, in phyſic, a diſorder peculiar to a certain part of the body, and not ariſing from any preceding diſeaſe; in which ſenſe, it is oppoſed to ſympathetic. Thus, an epilepſy is idiopathic, when it happens merely thro' ſome fault in the brain; and ſympathetic, when it is the conſequence of ſome other diſorder.

IDIOSYNCRASY, among phyſicians, denotes a peculiar temperament of body, whereby it is rendered more liable to certain diſorders, than perſons of a different conſtitution uſually are. See the article TEMPERAMENT.

IDIOT, or IDEOT, a perſon that is born a natural fool.

Such a perſon is not to be proſecuted for any crime, as not having knowledge to diſtinguiſh good from evil; yet it is ſaid, that if a man has ſo much knowledge as to meaſure a yard of cloth, tell or number twenty-pence in ſmall money, or regularly to name the days of the week, or to beget a child, he ſhall not, by our laws, be accounted an ideot.

The king has a right to the cuſtody of an idiot's lands, and to receive the profits of the ſame during his life, without committing waſte; and finding him and his family, if he have any, neceſſaries.

IDOLATRY, ειδωλολατρεια, a word of greek original, compounded of ειδωλον an image, and λατρευειν, to worſhip or ſerve.

Idolatry, or the worſhip of idols, may be diſtinguiſhed into two ſorts. By the firſt, men adore the works of Gods, the ſun, the moon, the ſtars, angels, dæmons, men and animals; by the ſecond, men worſhip the work of their own hands, as ſtatues, pictures, and the like: and to theſe may be added a third, that by which men have worſhipped the true God under ſenſible figures and repreſentations. This indeed may have been the caſe with reſpect to each of the above kinds of idolatry; and thus the Iſraelites adored God under the figure of a calf.

Some authors make idolatry to be more antient than the deluge, and believe that it began in the time of Enos; for which they cite the laſt verſe of the fourth chapter of Geneſis, where, according to our verſion, it is ſaid, "Then began "men to call upon the name of the "Lord;" but which theſe authors render, "Then began men to profane the "name of the Lord;" that is, to corrupt the worſhip of God by idolatry. "At this time, ſays Maimonides, men "began to ſtudy the motions of the "heavenly bodies, and from thence were "led to think, that they were the mi"niſters of God in the government of "the world. This induced them to "praiſe, honour and adore them, as

“ his officers or ſubſtitutes, and upon “ this foundation, they erected temples, “ and offered ſacrifices to the heavenly “ bodies.”

Others are of opinion, that idolatry did not begin till after the deluge, and that it had its riſe in Babylon; where divine honours were firſt paid to Jupiter Belus. If this be the truth of the caſe, it may not be improbable that the idolatry and polytheiſm which prevailed after the deluge, might ſpring from the impiety and atheiſm before the deluge: for it being natural for men to paſs from one extreme to another, thoſe who lived immediately after the deluge, and had been, as it were, witneſſes of the puniſhment inflicted on atheiſm and impiety, might by ignorance be led to ſuperſtition; and for fear of relapſing into atheiſm, which had deſtroyed the world, might ſet up the worſhip of an infinite number of gods. This is not to be underſtood of Noah himſelf, or his ſons, who muſt be ſuppoſed to have had the knowledge of the true god; but of their deſcendants, upon the diviſion of tongues and diſperſion of the people.

However this be, it ſeems clear, that the ſtars were the firſt objects of idolatrous worſhip; and that on account of their beauty, their influence on the productions of the earth, and the regularity of their motions, particularly the ſun and moon, which were conſidered as the moſt glorious and reſplendent images of the deity: afterwards, as their ſentiments became more corrupted, they began to form images, and to entertain the opinion, that by virtue of conſecration, the gods were called down, to inhabit or dwell in their ſtatues. Hence Arnobius takes occaſion to rally the pagans for guarding ſo carefully the ſtatues of their gods, who, if they were really preſent in their images, might ſave their worſhippers the trouble of ſecuring them from thieves and robbers. For the pagan gods, ſee the article God.

As to the adoration which the antient pagans paid to the ſtatues of their gods; it is certain that the wiſer and more ſenſible heathens conſidered them only as ſimple repreſentations of figures deſigned to recal to their minds the memory of their gods. This was the opinion of Varro and Seneca: and the ſame ſentiment is clearly laid down in Plato, who maintains, that images are inanimate, and that all the honour paid to them has reſpect to the gods whom they repreſent. But as to the vulgar, they were ſtupid enough to believe the ſtatues themſelves to be gods, and to pay divine worſhip to ſtocks and ſtones.

Soon after the flood, idolatry ſeems to have been the prevailing religion of all the world; for wherever we caſt our eyes at the time of Abraham, we ſcarcely ſee any thing but falſe worſhip and idolatry. And it appears from ſcripture, that Abraham's forefathers, and even Abraham himſelf, were for a time idolaters. The Hebrews were indeed expreſsly forbidden to make any repreſentation of God; they were not ſo much as to look upon an idol: and from the time of the Maccabees to the deſtruction of Jeruſalem, the Jews extended this precept to the making the figure of any man; by the laws of Moſes, they were obliged to deſtroy all the images they found, and were forbidden to apply any of the gold or ſilver to their own uſe, that no one might receive the leaſt profit from any thing belonging to an idol. Of this the Jews, after they had ſmarted for their idolatry, were ſo ſenſible, that they thought it unlawful to uſe any veſſel that had been employed in ſacrificing to a falſe god; to warm themſelves with the wood of a grove, after it was cut down; or to ſhelter themſelves under its ſhade.

But the preaching of the chriſtian religion, wherever it prevailed, entirely rooted out idolatry, as did alſo that of Mahomet, which is built on the worſhip of one God. It muſt not, however, be forgotten, that the proteſtant chriſtians charge thoſe of the church of Rome with paying an idolatrous kind of worſhip to the pictures or images of ſaints and martyrs: before theſe, they burn lamps and wax-candles; before theſe, they burn incenſe, and kneeling offer up their vows and petitions: they, like the pagans, believe that the ſaint to whom the image is dedicated, preſides in a particular manner about its ſhrine, and works miracles by the intervention of its image; and that if the image was deſtroyed or taken away, the ſaint would no longer perform any miracle in that place.

IDYLLION, ειδυλλιον, in antient poetry, is only a diminutive of the word ειδος, and properly ſignifies any poem of moderate extent, without conſidering the ſubject. But as the collection of Theocritus's poems, were called idyllia, and the paſtoral pieces being by far the beſt in this collection, the term idyllion ſeems to be now appropriated to paſtoral pieces. See the article PASTORAL POETRY.

So very different are our modern idyllions from thoſe of the antients, by introducing none but allegorical ſhepherds, that a literal tranſlation of Theocritus's idyllions, however well executed, would be reliſhed only by people of taſte, and thoſe too well acquainted with the ſimplicity and manners of the antients.

JEALOUSY, in general, denotes the fear of a rival; but is more eſpecially underſtood of the ſuſpicion, which married people entertain of each others fidelity and affection.

Bitter waters of JEALOUSY, in jewiſh antiquity, certain conſecrated waters, which a woman was obliged to drink, in order to clear herſelf of the crime of adultery, whereof her jealous huſband accuſed her; the conſequence of which draught was, that if innocent ſhe ſuffered no harm, but if guilty her belly ſwelled, *&c.*

JEAN DE ANGELI, a town of Guienne, in France, thirty five miles ſouth-eaſt of Rochelle.

JEAN DE LUZ, a port of France, in the province of Gaſcony, ſituated near the frontiers of Spain: weſt long 1° 32′, north lat. 43° 30′.

JEAN DE MAURIENNE, a city in the dutchy of Savoy, thirty miles ſouth-eaſt of Chamberry: eaſt long. 6° 8′, north lat. 45° 16′.

JEAN PIED DE PORT, a town of the province of Navarre, in France, ſituated on the river Nive, on the frontiers of Spain: weſt long 1° 20′, north lat. 43° 16′.

JECORINUS, in ichthyology, a fiſh, otherwiſe called hepatus. See the article HEPATUS.

JECUR, the LIVER, in anatomy. See the article LIVER.

JECUR UTERINUM, in anatomy, a name by which ſome call the placenta. See the article PLACENTA.

JEDBURGH, the capital of Tiviotdale or Roxburgh, in Scotland, thirty ſix miles ſouth-eaſt of Edinburgh; weſt long. 2° 15′, north lat. 55° 25′.

JEDDO, the capital city of Japan Proper, ſituated on the eaſt-ſide of the iſland; eaſt long. 141° north lat. 36°.

The ſplendor of the royal palace and public buildings of this city, in the opinion of thoſe Europeans who have ſeen it, is no where to be equalled. The emperor's palace and gardens, which are in the middle of the city, are five miles in circumference. All the houſes are built upon one floor, and the rooms are only divided by folding ſcreens.

JEER, or JEER-ROPE, in a ſhip, is a large rope reeved thro' double or treble blocks, laſhed at the maſt head, and on the yard, in order to hoiſt or lower the yards.

JEERS, or, being brought to the jeers, in the ſea-language, ſignifies a perſon's being puniſhed at the jeer-capſtan, by having his arms extended croſs-wiſe, and tied to the capſtan-bar when thruſt thro' the barrel, and ſtanding thus, with a heavy weight about his neck. In this poſture he is obliged to continue till he is either brought to confeſs ſome crime of which he is accuſed, or has ſuffered the puniſhment which the captain has ſentenced him to undergo.

JEHOVAH, one of the ſcripture names of God, ſignifying the Being who is ſelf-exiſtent, and gives exiſtence to others. See the article GOD.

So great a veneration had the Jews for this name, that they left off the cuſtom of pronouncing it, whereby its true pronunciation was forgotten. They call it tetragrammaton, or the name with four letters; and believe, that whoever knows the true pronunciation of it cannot fail to be heard by God.

JEJUNUM, in anatomy, the ſecond of the ſmall guts, ſo called becauſe it is uſually found empty. This is owing to the fluidity of the chyle, the greater ſtimulus of the bile in it, and the abundance of the lacteal veſſels with which it is furniſhed. Its ſituation is in the region above the navel; it has a great many connivent glands. Its beginning is where the duodenum ends; and it terminates, where theſe valves are obliterated: its length is different in various ſubjects; but is uſually between thirteen and ſixteen ſpans. See INTESTINES.

JEKYL, a ſmall iſland in the mouth of the river Alatamaha, in Georgia, fortified by general Oglethorp.

JEMPTERLAND, *Jemptia*, a province of Sweden, bounded by Angermania on the north; by Medelpadia on the eaſt, by Helſingia on the ſouth, and by Norway on the weſt.

JENA, a city of Germany, in the circle of Upper Saxony, and the Langraviate of Thuringia: eaſt long. 11° 44′, north lat. 51°.

JENDE, a great lake, in the province of Finland, in Sweden.

JENISA, a large river of Ruſſia, that runs from ſouth to north thro' Siberia, and falls into the frozen ocean in 72° of eaſt longitude, and 70° of north lat.

JENKOPING, a city of Sweden, in the province of Gothland, ſituated ninety miles ſouth-eaſt of Gottenburg: eaſt long 14° 30′, north 57° 30′.

JENO, or GENO, a town of Upper Hungary, twenty miles ſouth of Great Waradin, and ſubject to the houſe of Auſtria.

JENTLING, in ichthyology, the blue chub, a fiſh caught in the Danube, and larger than the common chub. See the article CHUB.

JEOFAILE, or JEOFAYLE, in law, a term uſed for any overſight in pleading, or any other proceedings at law.

The ſhewing of theſe defects or overſights, was formerly often practiſed by the counſel; and when the jury came into court, in order to try the iſſue, they ſaid, this inqueſt you ought not to take; and after verdict they would ſay to the court, to judgment you ought not to go: but ſeveral ſtatutes have been made to avoid the delays occaſioned by ſuch ſuggeſtions; and a judgment is not to be ſtayed after verdict for miſtaking the chriſtian or ſurname of either of the parties, or in a ſum of money, or in the day, month, year, *&c.* where the ſame are rightly named in any preceding record.

JEREMIAH, *the prophecy of*, a canonical book of the Old Teſtament. This divine writer was of the race of the prieſts, the ſon of Hilkiah of Anathoth, in the tribe of Benjamin. He was called to the prophetic office when very young, about the thirteenth of Joſiah, and continued in the diſcharge of it above forty years. He was not carried captive to Babylon with the other Jews, but remained in Judea to lament the deſolation of his country. He was afterwards a priſoner in Egypt with his diſciple Baruch, where it is ſuppoſed he died in a very advanced age. Some of the chriſtian fathers tell us, he was ſtoned to death by the Jews, for preaching againſt their idolatry; and ſome ſay, he was put to death by Pharoh Hophra, becauſe of his prophecy againſt him. Part of the prophecy of Jeremiah relates to the time after the captivity of Iſrael, and before that of Judah, from the firſt chapter to the forty-fourth; and part of it was in the time of the latter captivity, from the forty-fourth chapter to the end. The prophet lays open the ſins of Judah with great freedom and boldneſs, and reminds them of the ſevere judgments, which had befallen the ten tribes for the ſame offences. He paſſionately laments their misfortune, and recommends a ſpeedy reformation to them. Afterwards he predicts the grievous calamities that were approaching, particularly the ſeventy years captivity in Chaldæa. He likewiſe foretells their deliverance and happy return, and the recompence which Babylon, Moab, and other enemies of the Jews ſhould meet with in due time. There are likewiſe ſeveral intimations in this prophecy concerning the kingdom of the Meſſiah; alſo ſeveral remarkable viſions, and types, and hiſtorical paſſages relating to thoſe times. The fifty-ſecond chapter does not belong to the prophecy of Jeremiah, which probably was added by Ezra, and contains a narrative of the taking of Jeruſalem, and of what happened during the captivity of the Jews, to the death of Jechonias. St. Jerom has obſerved upon this prophet, that his ſtile is more eaſy than that of Iſaiah and Hoſea; that he retains ſomething of the ruſticity of the village where he was born; but that he is very learned, and majeſtic, and equal to thoſe two prophets in the ſenſe of his prophecy.

JERSEY, an iſland in the engliſh channel, fifteen miles weſt of the coaſt of Normandy, and eighty miles ſouth of Portland in Dorſetſhire: weſt long. 2° 20′, north lat. 49° 20′.

It is about 30 miles in circumference, and contains twelve pariſhes, the chief town is St. Hillary. Though the iſland is ſubject to England, the inhabitants are ſtill governed by Norman laws, and the courts of England have no juriſdiction there.

New JERSEY, a province in North America, which may be bounded on the north by a line drawn from the river Delawar to Hudſon's river, which divides it from New-York; by the Atlantic Ocean, on the eaſt; by the ſame ocean on the ſouth, and by Delawar bay and river, which ſeparates it from Penſilvania, on the weſt. It lies between 74° and 76° of weſt long. and between 39° and 41° of north lat. and is about 140 miles in length, and 60 in breadth. It is ſubject to England. The chief towns are Burlington, Perth-Amboy, and Elizabeth Town. It produces corn, black cattle, furs, and pipe-ſtaves.

JERUSALEM, the capital city of Judea, or Paleſtine, in Aſiatic Turky, ſituated thirty miles eaſt of the Levant, or Mediterranean Sea, and ninety miles ſouth of Damaſcus: eaſt long. 36°, north lat. 32°.

It ſtands on a high rock, with ſteep aſcents on every ſide, except on the north, and is ſurrounded with a deep valley, which is again incompaſſed with hills. The city is at preſent three miles in circumference, and has a little altered its ſituation; for Mount Calvary, which was formerly without the walls, ſtands now in the middle of the city, and Mount Sion, which ſtood near the center, is now without the walls.

JESI, a city of Italy, in the province of Ancona, and territory of the pope: eaſt long. 14° 40′, north lat. 43° 45′.

JESSE, a branched candleſtick, or ſconce; an uſeful ornament, firſt introduced into our churches about the year 1100.

JESSELMERE, the capital of the province of the ſame name in the Eaſt Indies, ſubject to the Mogul: eaſt long. 73° 20′, north lat. 27°.

JESSO, or YEDSO, a country of Aſia, which lies north of Japan, and is ſaid to extend north eaſt to the continent of America: eaſt longitude 140°, north latitude 40°.

JESUAT, a province of India, bounded by Patan on the north, and by Bengal on the ſouth; ſubject to the mogul.

JESUITES, or the ſociety of Jeſus, a moſt famous religious order in the romiſh church, founded by Ignatius Loyola, a native of Guipuſcoa in Spain, who in the year 1538, aſſembled ten of his companions at Rome, principally choſen out of the univerſity of Paris, and made a propoſal to them to form a new order; when, after many deliberations, it was agreed to add to the three ordinary vows of chaſtity, poverty, and obedience, a fourth; which was, to go into all countries whether the pope ſhould pleaſe to ſend them, in order to make converts to the romiſh church. Two years after, pope Paul III. gave them a bull, by which he approved this new order, giving them a power to make ſuch ſtatutes as they ſhould judge convenient: on which, Ignatius was created general of the order; which in a ſhort time ſpread over all the countries of the world, to which Ignatius ſent his companions, while he ſtaid at Rome, from whence he governed the whole ſociety.

The entire ſociety is compoſed of four ſorts of members; novices, ſcholars, ſpiritual and temporal coadjutors, and profeſſed members. The novices continue ſo two years, after which they are admitted to make the three ſimple vows, of chaſtity, poverty and obedience, in the preſence of their ſuperiors: the ſcholars add ſome ſpiritual exerciſes to their ſtudies. The ſpiritual coadjutors aſſiſt the profeſſed members, and alſo make the three ſimple vows: the temporal coadjutors, or lay brothers, take care of the temporal affairs of the ſociety; and the profeſſed members, which compoſe the body of the ſociety, beſides the three ſimple vows, add a ſpecial vow of obedience to the head of the church in every thing relating to miſſions among idolaters and heretics. They have profeſſed houſes for their profeſſed members and their coadjutors; colleges, in which the ſciences are taught to ſtrangers; and ſeminaries, in which the young jeſuits go thro' a courſe of philoſophy and theology. They are governed by a general, who has four aſſiſtants, and who appoints rectors, ſuperiors of houſes, provincials, viſitors, and commiſſaries. The diſcipline of theſe houſes, and eſpecially of the colleges, was regulated by Ignatius himſelf.

JESUITS POWDER. See POWDER.

JET, *gagates*, in natural hiſtory, a ſolid, dry, opake, inflammable ſubſtance, found in large detached maſſes, of a fine and regular ſtructure, having a grain like that of wood, ſplitting more eaſily horizontally than in any other direction, very light, moderately hard, not fuſible, but readily inflammable, and burning a long time with a fine greeniſh flame.

It is of a fine deep black colour, very gloſſy and ſhining, except upon its ſurface, where it has been fouled by accident. When examined by the microſcope, it is found to be compoſed of a number of parallel plates, very thin, and laid cloſely upon one another. It is not ſoluble in, nor makes any effervеſcence with acids. It ſhould be choſen of the deepeſt black, of a moderate hardneſs, very light, and ſuch as will ſplit moſt evenly in an horizontal direction; this being its great characteriſtic, by which it is diſtinguiſhed from the cannel-coal, which breaks equally eaſy any way.

Jet is of great uſe to perfumers, and is ſometimes preſcribed in medicine. Dioſcorides tells us, that it is an excellent emollient and diſcutient, and recommends a fumigation of it for diſeaſes of the womb; and among the eaſtern nations,

tions, it is ſtill in high repute as a cordial, a ſtrengthener, and prolonger of life.

Every pound of jet pays on importation a duty of $7\frac{70}{100}$d. and draws back $6\frac{75}{100}$d. on exportation.

JET D'EAU, a french term, frequently alſo uſed with us, for a fountain that caſts up water to a conſiderable height in the air. See the article FOUNTAIN.

JETSON, JETSEN, or JETSAM, in law, is uſed for any thing thrown out of a ſhip or veſſel that is in danger of being a wreck, and which is driven by the waves on ſhore. See FLOTSON.

JEVER, a town of Germany, in the circle of Weſtphalia, ſixteen miles north-eaſt of Embden: eaſt long. 7° 5′, north lat. 53° 50′.

JEWEL, any precious ſtone, or ornament beſet with them. See the articles, DIAMOND, RUBY, *&c.*

JEWEL-OFFICE, an office belonging to the crown, that has the charge of faſhioning and weighing the king's plate, and delivering it out by warrants from the lord chamberlain.

The principal officer is the maſter of the jewel-office, who has a ſalary of 450 l. per annum.

JEWS, thoſe who profeſs obedience to the laws and religion of Moſes, before whom every man worſhipped God according to the inclination of his own heart.

How far the religious ceremonies of the Jews were copied from thoſe of the Egyptians, among whom they had ſo long ſojourned, or how far they were typical of ſomething future, are queſtions which we leave to be diſcuſſed by divines. But as to the religion of the modern Jews, it is a manifeſt abſurdity; ſince being without a temple, ſacrifices, *&c.* it cannot be conſidered as ſubſiſting any longer.

Be this as it will, we ſhall ſubjoin a few of their miſcellaneous cuſtoms, as related by Leo of Modena, an author of their own.

When a Jew builds an houſe, he muſt leave part of it unfurniſhed, in remembrance that the temple and Jeruſalem now lie deſolate. They lay great ſtreſs upon frequent waſhings. They abſtain from meats prohibited by the levitical law; for which reaſon, whatever they eat muſt be dreſſed by Jews, and after a manner peculiar to themſelves. Every Jew is obliged to marry, and a man who lives to twenty unmarried, is accounted as actually living in ſin.

The Jews, it is ſaid, were formerly a the diſpoſal of the chief lord where they lived, and likewiſe all their goods. A Jew may be a witneſs by our law, being ſworn on the Old Teſtament, and taking the oaths to the government.

For a farther account of the Jews, ſee th articles CARAITES, CIRCUMCISION LEVITES, PASSOVER, PHARISEES RABBI, SADDUCEES, SANHEDRIM SYNAGOGUE, TALMUD, *&c.*

JEW'S STONE, *lapis judaicus*, in the materia medica, an extraneous foſſile, bein nothing but the petrified ſpine of a larg echinus marinus. It is of the figure o an olive, and is furrowed and ridged alternately in a longitudinal direction. I is ſolid, conſiderably heavy, and difficul to break; being, indeed, a petrefactio ſolely compoſed of ſpar, and that tolerably pure. Hence, it is ſaid to be a great dieuretic and lithontriptic; and tha it poſſeſſes the former of theſe virtues i very certain, but it is not equally ſur that it has any thing of the other. I acts in this caſe as mere ſpar, all th ſpar in the world, whether in its ſoli form, or in a natural ſtate of ſolutio in water, being diuretic. The lapis judaicus is given in an impalpable powder and the doſe is from one ſcruple to dram.

JEWISH HOURS, in chronology. See th article HOUR.

JEZIDES, among the mohometans, a ter of ſimilar import with heretics amon chriſtians.

The jezides are a numerous ſect inhabiting Turky and Perſia, ſo called fro their head Jezid, an arabian prince, wh ſlew the ſons of Ali, Mahomet's father in-law, for which reaſon he is reckone a parricide, and his followers heretics There are about 200,000 jezides i Turky and Perſia; who are of two ſorts black and white. The white are cla like Turks, and diſtinguiſhed only b their ſkirts, which are not ſlit at the nec like thoſe of others, but have onl a round hole to thruſt their heads thro' This is in memory of a golden ring, o circle of light, which deſcended fro heaven upon the neck of their cheq, th head of their religion, after his undergoing a faſt of forty days. The blac jezides, tho' married, are the monks o religious of the order; and theſe ar called Fakirs.

The Turks exact exceſſive taxes from th Jezides, who hate the Turks as thei

morta

mortal enemies, and when, in their wrath, they curſe any creature, they call it muſſulman: but they are great lovers of the chriſtians, being more fond of Jeſus Chriſt than of Mahomet, and are never circumciſed but when forced to it. They are extremely ignorant, and believe both the bible and the koran without reading either of them: they make vows and pilgrimages, but have no places of religious worſhip.

All the adoration they pay to God conſiſts of ſome ſongs in honour of Jeſus Chriſt, the Virgin, Moſes, and ſometimes Mahomet; and it is a principal point of their religion never to ſpeak ill of the devil, leſt he ſhould reſent the injury, if ever he ſhould come to be in favour with God again, which they think poſſible: whenever they ſpeak of him, they call him the Angel Peacock. They bury their dead in the firſt place they come at, rejoicing as at a feſtival, and celebrating the entry of the deceaſed into heaven. They go in companies like the Arabians, and change their habitations every fifteen days. When they get wine, they drink it to exceſs, and it is ſaid, that they ſometimes do this with a religious purpoſe, calling it the blood of Chriſt. They buy their wives, and the market price is two hundred crowns for all women, handſome or not, without diſtinction.

IGLAW, a town of Germany, in the province of Moravia, ſituated on the river Igla, on the frontiers of Bohemia; ſubject to the houſe of Auſtria: eaſt long. 15° 7′, north lat. 49° 16′.

IGNIS, FIRE, in phyſiology, chemiſtry, *&c.* See the article FIRE.

IGNIS-AQUA, Helmont's name for the alkaheſt. See ALKAHEST.

IGNIS-FATUUS, in meteorology, a meteor otherwiſe called, will-with-a-wiſp. See the article WILL-*with-a-wiſp*.

IGNIS GEHENNÆ, the ſame with the univerſal diſſolvent, or alkaheſt. See the article ALKAHEST.

IGNIS JUDICII, in our old cuſtoms, a purgation by fire. See ORDEAL.

IGNISPICIUM, in antiquity, a ſpecies of pyromancy, wherein predictions were drawn from the fire uſed in ſacrifices. See PYROMANCY and DIVINATION.

IGNITION, in chemiſtry the heating metals red-hot, without melting them.

Lead and tin are too ſoft, to bear ignition; which takes effect only in the harder metals, as gold and ſilver, but eſpecially iron.

IGNORAMUS, in law, a term which ſignifies we are ignorant. This is uſed when the grand jury impanelled on the inquiſition of criminal cauſes, reject the evidence as too weak to make good the preſentment or indictment brought againſt a perſon, ſo as to bring him upon his trial by a petty jury; in which caſe, they indorſe this word on the back of the bill of indictment. In conſequence of which, all further proceedings againſt the party accuſed are ſtopped, and the ſuppoſed offender is delivered without further anſwer.

IGNORANCE, *ignorantia*, the privation or abſence of knowledge. See the article KNOWLEDGE.

The cauſes of ignorance, according to Locke, are chiefly theſe three. 1. Want of ideas. 2. Want of a diſcoverable connection between the ideas we have. 3. Want of tracing and examining our ideas. See the article IDEA.

As to the firſt of theſe cauſes, he obſerves, that all the ſimple ideas we have, are confined to the obſervation of our ſenſes, and the operations of our own mind, which we are conſcious of in ourſelves. What other ideas it is poſſible other creatures may have, by the aſſiſtance of other ſenſes and faculties, more or perfecter than we have, or different from ours, it is not for us to determine; but to ſay or think there are no ſuch, becauſe we conceive nothing of them, is no better an argument than if a blind man ſhould be poſitive, that there was no ſuch thing as ſight and colours, becauſe he had no manner of idea of any ſuch thing. What faculties, therefore, other ſpecies of creatures have to penetrate into the nature and inmoſt conſtitutions of things, we know not. This we know, and certainly find, that we want other views of them beſides thoſe we have, to make diſcoveries of them more perfect. The intellectual and ſenſible world are in this perfectly alike, that the parts which we ſee of either of them, hold no proportion with that we do not ſee; and whatſoever we can reach with our eyes, or our thoughts, of either of them, is but a point, and almoſt nothing in compariſon of the reſt.

Another great cauſe of ignorance, is the want of thoſe ideas we are capable of. This keeps us in ignorance of things which we conceive capable of being known. We have ideas of bulk, figure, and motion: yet not knowing what is the particular bulk, motion, and figure of the greateſt part of the bodies of the univerſe, we are ignorant of the ſeveral powers, efficacies, and ways of operation, by which the effects we daily ſee are produced. Theſe are hid from us, in ſome things, by being too remote; in others, by being too minute.

When we conſider the vaſt diſtance of the known and viſible parts of the world, and the reaſon we have to think, that what lies within our ken, is but a ſmall part of the immenſe univerſe, we ſhall then diſcover an huge abyſs of ignorance. What are the particular fabrics of the great maſſes of matter which make up the whole ſtupendous frame of corporeal beings, how far they are extended, and what is their motion, and how continued, and what influence they have upon one another, are contemplations in which at the firſt glimpſe our thoughts are loſt. If we confine our thoughts to this little canton, I mean this ſyſtem of our ſun, and the groſſer maſſes of matter that viſibly move about it; what ſeveral ſorts of vegetables, animals, and intellectual corporeal beings, infinitely different from thoſe of our little ſpot of the earth, may probably be in other planets, to the knowledge of which, even of their outward figures and parts, we can no way attain while we are confined to this earth, there being no natural means, either by ſenſation or reflection, to convey their certain ideas into our minds?

There are other bodies in the univerſe no leſs concealed from us by their minuteneſs. Theſe inſenſible corpuſcles being the active parts of matter, and the great inſtruments of nature, on which depend all their ſecondary qualities and operations, our want of preciſe diſtinct ideas of their primary qualities, keeps us in incurable ignorance of what we deſire to know about them. Did we know the mechanical affections of rhubarb or opium, we might as eaſily account for their operations of purging and cauſing ſleep, as a watchmaker can for the motions of his watch. The diſſolving of ſilver in aqua fortis, or gold in aqua regia, and not *vice verſa*, would be then perhaps no more difficult to know, than it is to a ſmith to underſtand why the turning of one key will open a lock, and not the turning of another. But while we are deſtitute of ſenſes, acute enough to diſcover the minute particles of bodies, and to give us ideas of their mechanical affections, we muſt be content to be ignorant of their properties and operation; nor can we be aſſured about them any farther, than ſome few trials we make, are able to reach: but whether they will ſucceed again another time, we cannot be certain. This hinders our certain knowledge of univerſal truths concerning natural bodies: and herein our reaſon carries us very little beyond particular matters of fact. And therefore I am apt to doubt, that how far ſoever human induſtry may advance uſeful and experimental philoſophy in phyſical things, yet the ſcientifical will ſtill be out of our reach; becauſe we want perfect and adequate ideas of thoſe very bodies which are neareſt to us, and moſt under our command.

This, at firſt ſight, ſhews us how diſproportionate our knowledge is to the whole extent even of material beings: to which if we add the conſideration of that infinite number of ſpirits that may be, and probably are, which are yet more remote from our knowledge, of which we have no cognizance, we ſhall find this cauſe of ignorance, conceal in an impenetrable obſcurity, almoſt the whole intellectual world; a greater certainly, and a more beautiful world than the material. For bating ſome very few ideas of ſpirit, which we get from our own minds by reflection, and from thence the beſt we can collect of the father of all ſpirits, the author of them and us, and all things, we have no certain information, ſo much as of the exiſtence of other ſpirits, but by revelation; much leſs have we diſtinct ideas of their different natures, ſtates, powers, and ſeveral conſtitutions, in which they either agree or differ one from another, and from us. And therefore in what concerns their different ſpecies and properties, we are under an abſolute ignorance.

The ſecond cauſe of ignorance is the want of a diſcoverable connection between thoſe ideas we have: where we want that, we are utterly incapable of univerſal and certain knowledge; and are, as in the former caſe, left only to obſervation and experiment. Thus the mechanical affections of bodies, having no affinity at all with the ideas they produce in us, we can have no diſtinct knowledge of ſuch operations beyond our experience; and can reaſon no otherwiſe about them, than as the effects or appointment of an infinitely wiſe agent, which perfectly ſurpaſs our comprehenſions.

The operation of our minds upon our bodies is as inconceivable. How any thought ſhould produce a motion in body, is as remote from the nature of our ideas, as how any body ſhould produce any thought in the mind. If experience did not convince us that it is ſo, the conſideration of the things themſelves would never be able, in the leaſt, to diſcover it to us.

In ſome of our ideas there are certain relations, habitudes and connections ſo viſibly included in the nature of the ideas themſelves, that we cannot conceive them ſeparable from them by any power whatſoever: in theſe only, we are capable of certain and univerſal knowledge. Thus the idea of a right-lined triangle, neceſſarily carries with it an equality of its angles to two right ones. But the coherence and continuity of the parts of matter, the production of ſenſation in us, of colours and ſounds, *&c.* by impulſe and motion, being ſuch in which we can diſcover no natural connection with any ideas we have, we cannot but aſcribe them to the arbitrary will and good pleaſure of the wiſe architect.

The things which we obſerve always proceed regularly, we may conclude, act by a law that is ſet them, but yet by a law that we know not; by which, tho' cauſes work ſteadily, and effects conſtantly flow from them, yet their connections and dependencies not being diſcoverable in our ideas, we can only have an experimental knowledge of them. Several effects come every day within the notice of our ſenſes, of which we have ſo far ſenſible knowledge; but of the cauſes, manner, and certainty of their production, we muſt for the foregoing reaſons be content to be ignorant. In theſe we can go no farther than particular experience informs us of matter of fact, and by analogy, gueſs what effects the like bodies are, upon other trials, like to produce.

The third cauſe of ignorance is our want of tracing thoſe ideas we have, or may have, and finding out thoſe intermediate ideas which may ſhew us what habitude of agreement or diſagreement they may have one with another. Thus many are ignorant of mathematical truths, for want of application in enquiring, examining, and by due ways comparing thoſe ideas.

IGNORANCE, in law, is a want of knowledge of the laws, which will not excuſe a perſon from ſuffering the penalty inflicted on the breach of them: for every one is obliged, at his peril, to know the laws of the land. An infant who is juſt arrived at the age of diſcretion, and who may therefore be ſuppoſed to be ignorant of the law, is puniſhable for crimes; but at the ſame time infants of tender age, who are naturally ignorant, are excuſed. This is alſo the caſe with reſpect to perſons who are non compos mentis. See INFANT, LUNATIC, *&c.*

IGUANA, in zoology, an american ſpecies of lizard, with a long round tail, five toes on each foot, and the creſt of the throat and the dorſal ſuture dentated. See the article LIZARD.

IHOR, the capital of the province of Ihor, in Malacca, near the ſouth cape of the further peninſula of India, ſubject to the Dutch: eaſt long. 103°, north lat. 3°.

JIG, or GIGG, in muſic. See GIGG.

ILCHESTER, a borough-town of Somerſetſhire, fourteen miles ſouth of Wells. It ſends two members to parliament.

ILDEFONSO, a palace belonging to the king of Spain.

ILEX, the HOLM OAK, or EVER-GREEN-OAK, in botany, a genus of the tetrandria-tetragynia claſs of plants, the flower of which conſiſts of one plain petal, divided into four roundiſh, hollow, and open ſegments, cohering only at their bottoms: the fruit is a roundiſh berry, with four cells, each of which contains a ſingle, hard, oblong, and obtuſe ſeed, gibbous on one ſide, and angular on the other.

The wood of theſe trees is accounted very good for many ſorts of tools and utenſils, as mallet-heads, mall-balls, chairs, wedges, beetles, pins, *&c.* as alſo for paliſadoes. It likewiſe affords the moſt durable charcoal in the world.

The kermes, or ſpecies known by the name of the holm-oak, is of a much lower ſtature than the other ſpecies of ever-green oaks; ſeldom growing to the height of a tree. See KERMES.

ILHEOS, or RIO DE ILHEOS, a province of Brazil in South America, ſubject to Portugal. It is bounded by the bay of All-ſaints on the north, and by the Atlantic ocean on the eaſt.

ILIAC PASSION, in medicine, a pain in the ſmall inteſtines, apt to turn to an inflammation, in which their periſtaltic motion is inverted, and their contents, and even the excrements themſelves, are voided by the mouth in vomiting. Nothing will paſs down, not ſo much as a flatus. It is often attended with fatal ſymptoms.

This diſeaſe, according to Hoffman, is preceded with coſtiveneſs, which is ſoon followed with moſt ſharp and violent pains, with an inflation, diſtenſion, and a tumour of the umbilical region, which feels hard to the touch; the body is ſo hard bound, that neither wind nor excrements can paſs downwards: ſoon after the wind firſt makes its way upward, there comes on a nauſea, and a frequent vomiting of a bilious and pituitous matter; the breathing grows difficult, and whatever is eaten or drank is ſoon thrown up again; reddiſh fæces, with a ſtinking ſmell, are afterwards forced up by vomiting; this is ſucceeded by loſs of ſtrength, a preternatural heat, a hard and contracted pulſe, with great thirſt: the urine is red, and is voided with difficulty. When the caſe becomes deſperate, a hiccoughing and delirium appear; the nerves are diſtended, the body is all in a cold ſweat, and violent convulſions and fainting fits put an end to the patient.

This diſeaſe may proceed from a rupture, either of the ſcrotum or the groin; from poiſons, from any thing that ſtops up the paſſage thro' the ſmall guts, ſuch as hard, dry food, cheſnuts, ſea-biſcuits, quinces, pears, unripe acerb fruit, when eaten in large quantities; to which drinking little, a ſedentary life, and a melancholy diſpoſition of mind, will greatly contribute: theſe all tend to harden the fæces: the groſs inteſtines may alſo be plugged up with ſcybals, eſpecially if a perſon, either through ſhame, or want of conveniency, does not liſten to the calls of nature.

As to the cure, Sydenham thinks it neceſſary firſt of all to bleed in the arm, and afterwards, in an hour or two, exhibit a powerful clyſter; the ſmoke of tobacco blown into the bowels through an inverted pipe, he recommends as the moſt efficacious remedy: this may be repeated ſome time after, unleſs the effect of the firſt renders it unneceſſary. If the diſeaſe will not yield to this, a pretty ſtrong cathartic is adviſeable: thus, take of the pill of ſimple colocynth, half a dram; of calomel, one ſcruple; and as much as is ſufficient of the balſam of peru. Make the whole into four pills to be taken out of a ſpoonful of ſyrup of violets, taking no liquor upon them leſt they cannot be retained: or, take reſin of ſcammony, or inſtead of it, reſin of jalap, twelve grains; calomel, one ſcruple; reduce them into powder, taking this out of a ſpoonful of cow's milk: take one or two ſpoonfuls of the ſame milk after ſwallowing them. If the patient cannot retain this, let him take twenty-five drops of the thebaic tincture in half an ounce of ſpirituous cinnamon-water; and when the vomiting and pain remit, let the cathartic be repeated; and if the pain returns, give the anoydne again, and repeat it every fourth or ſixth hour till the inteſtines are eaſy, and the cathartic begins to paſs downwards. When it has done working, give the following draught: take of ſpirituous water of cinnamon, two ounces; of thebaic tincture, twenty-five drops; of which make a draught, which is to be repeated twice or thrice a day, till the vomiting and pains ceaſe: afterwards it will be adviſeable to give a paregoric, at bed-time, for ſeveral nights.

Hoffman adviſes, after the pains are mitigated by anodynes, that a cataplaſm ſhould be applied to the hypogaſtric region, to ſtop the vomiting and hiccoughing, which may be compoſed of equal parts of old venice-treacle, and expreſſed oil of nutmegs, with the addition of oil of mint and camphire. This done, a gentle laxative of manna, cream of tartar, and oil of ſweet almonds may be given with a more happy ſucceſs, if the excrements have been long retained. When there is an inflammation, nothing is better than ſix or eight grains of purified nitre, and half a grain of camphire mixed with ſome antiſpaſmodic powder, and then taken in a convenient vehicle. Outwardly apply a liniment of axungia humana, or any other penetrating fat, and a dram of camphire.

But when other things fail in the cure of the illiac paſſion, recourſe muſt be had to quickſilver; half a pound or a pound at moſt is ſufficient, with fat broth or oil; and the patient ſhould lie on his right ſide, or walk gently about the room, that its deſcent may be eaſier; but if there is an actual inflammation, the quickſilver ſhould not be uſed. Opiates may be uſed to mitigate the pain, provided they are exhibited in the beginning after bleeding, or before there is any ſigns of a mortification. Clyſters are generally very advantageous, for they relax the ſpaſm of the groſs inteſtines, and for this purpoſe warm water with ſpirit of marſhmallows will be ſufficient: they ſhould be given very ſoon after the firſt attack. When the iliac paſſion proceeds from an incarcerated hernia, then Heiſter recommends bleeding as of the greateſt advantage. See HERNIA.

ILIACUS MUSCULUS, in anatomy, a broad, thick muſcle, lying on the inſide of the os ilium. It is fixed by fleſhy fibres to the internal labium of the creſt of the os ilium, to that of the ſlope between the two anterior ſpines, to the inſides of theſe ſpines, to the ſuperior half of the inſide of this bone, and to the adjacent lateral part of the os ſacrum. All theſe fibres, contracting by degrees, run obliquely towards the lower part of the muſculus pſoas, uniting with it; and being fixed by a kind of aponeuroſis to the outſide of its tendon, all the way to the little trochanter.

ILIAD, ιλιας, in literary hiſtory, the name of an antient epic poem, the firſt and fineſt of thoſe compoſed by Homer.

The poet's deſign in the iliad was to ſhew the Greeks, who were divided into ſeveral little ſtates, how much it was their intereſt to preſerve a harmony and good underſtanding among themſelves: for which end, he ſets before them the calamities that befel their anceſtors from the wrath of Achilles, and his miſunderſtanding with Agamemnon; and the advantages that afterwards accrued to them from their union. The iliad is divided into twenty-four books, or rhapſodies, which are marked with the letters of the alphabet.

The critics maintain the iliad to be the firſt, and yet the beſt epic poem that ever appeared in the world. Ariſtotle's poetics are almoſt wholly taken up about it, forming precepts from that poet's practice. Some authors tell us, that Homer invented not only poetry, but all other arts and ſciences; and that there are viſible marks of a perfect knowledge of every one of them to be ſeen in the iliad. There is a tranſlation of this noble poem into our language, by the late ingenious Mr. Pope; being, perhaps, the moſt elegant, and moſt in imitation of the original, of any attempt that way in any language whatever.

ILIUM, in anatomy, the third and laſt of the ſmall guts, is ſituated principally below the navel, near the oſſa ilii; whence its name. Its length is various: ſometimes not more than fifteen, ſometimes twenty ſpans or more. Its beginning is where the valves of the jejunum ceaſe to be conſpicuous, and its end is where the larger inteſtines begin; in which place it is, in a very ſingular manner, inſerted into the left ſide of the colon. It has no other valves except that great one at the end, which is called, by many, valvula coli Bauhini: its glands are, in general, more numerous towards the end than in any other part.

ILIUM OS. See the article INNOMINATA OSSA.

ILL, a river which riſing near Baſil, in Switzerland, runs north through Alſace, and having paſſed by Colmar, Schelſtat, and Straſburgh, falls into the Rhine a little below the laſt city.

ILLECEBRUM, in botany, a genus of the pentandria-digynia claſs of plants, having no corolla; the fruit is a capſule approaching to a roundiſh figure, but pointed at each end, formed of five valves, containing only one cell, and covered by the calyx; the ſeed is ſingle, large, roundiſh, and pointed at each end.

ILLENOIS, the inhabitants of a country contiguous to the illenois-lake, in Canada, in north America, which is ſituated between 88° and 93° of weſt long. and between 41° and 46° of north lat.

ILLER, a river of Germany, which riſing in the mountains of Tyrol, runs north through Swabia, and falls into the Danube at Ulm.

ILLEVIABLE, in law, ſignifies any debt or duty that cannot be levied.

ILLUSTRIOUS, was antiently a title of honour in the roman empire, firſt given to the moſt diſtinguiſhed among the knights who had a right to bear the latus clavis. Afterwards it was given to the firſt rank of the honorati, that is, to the præfecti prætorii, treaſurers, comites, *&c.* There were, however different degrees among the illuſtrious; and as in Spain there are degrees of the firſt and ſecond claſs, ſo in Rome they had their illuſtres majores and minores. The novels of Valentinian diſtinguiſh five claſſes of the illuſtrious, among whom the illuſtres adminiſtratores bore the firſt rank.

ILMEN, a lake in the province of Great Novogrod, in Ruſſia, in 34° eaſt long. and 58° north lat.

ILMINSTER, a market-town of Somerſetſhire, twenty-four miles ſouth-weſt of Wells,

ILOCK, a town of Sclavonia, ſituated on the Danube, and ſubject to the houſe of Auſtria: eaſt long. 20° 32′, north lat. 45° 33′.

ILS, a river of Germany, which riſing in the mountains of Bohemia, runs ſouth and falls into the Danube at Paſſau.

ILSLEY, a market-town of Berkſhire, ten miles north-weſt of Reading.

IMAGE, in a religious ſenſe, is an artificial repreſentation or ſimilitude of ſome perſon or thing, uſed either by way of decoration and ornament, or as an object of religious worſhip and veneration; in which laſt ſenſe, it is uſed indifferently with the word idol. See IDOL.

There is no doubt but that theſe images, or idols, were at firſt of the plaineſt and moſt ſimple materials and as in the early ages people had but little ſkill in ſculpture, it is probable that they made choice of ſuch materials as were moſt eaſily wrought and faſhioned into the intended figure; from hence it is not unlikely that the firſt images were made of earth, and that to give them ſome beauty, they were painted with different colours. Thus Pliny tells us, that Tarquinius Priſcus cauſed a ſtatue of Jupiter Capitolinus to be made of earth and painted red. Next to earth, wood ſeems to have been the moſt common material for images; but in length of time they were made of braſs, ſilver, and gold. For the worſhip of images, ſee the articles GOD and IDOLATRY.

The worſhip of images among the chriſtians, occaſioned great conteſts both in the eaſtern and weſtern churches; but at length this worſhip, in ſpight of all oppoſition made againſt it, was allowed and enjoined.

The roman catholics boaſt of the miraculous effects of the images of their ſaints. The image of Jeſus Chriſt, which feeling itſelf wounded with a dagger by an impious wretch, laid its hand upon the wound, is famous at Naples. It is pretended that the image of St. Catharine of Sienna, has often driven out devils, and wrought other miracles: and that the lady of Lucca, when inſolently aſſaulted by a ſoldier, who threw a ſtone at her, and had like to have broken the head of the child Jeſus, whom ſhe held on her right arm, immediately ſet him on her left, and the child liked ſitting on that arm ſo well, that ſince that accident, he has never changed his ſituation.

As to the greek church, tho' they reject the uſe of graven images and ſtatues, they pay a boundleſs veneration to pictures, and upon ſolemn feſtivals plant the picture of the ſaint to whom the church is dedicated in the center of the church; and every perſon preſent ſalutes it not by kneeling or proſtration, but by giving it a kiſs. If the picture repreſents our bleſſed Lord, they kiſs its feet; if the virgin Mary, its hands; but if it be any other ſaint, they approach it with more familiarity, and kiſs its cheek. Before theſe pictures they alſo addreſs their prayers.

IMAGINATION, a power or faculty of the mind, whereby it conceives and forms ideas of things communicated to it by the outward organs of ſenſe.

Lord Bacon, having divided the doctrine of the mental faculties into logics and ethics, conſiders the imagination as performing the office of an agent or embaſſador on both ſides, and aſſiſting alike in the judicial and miniſterial capacity. Senſe, according to him, commits all ſorts of notions to the imagination, and reaſon afterwards judges of them. In like manner, reaſon tranſmits ſelect and approved notions to the imagination before the decree is executed; for imagination always precedes and excites voluntary motion, and is therefore a common inſtrument both to the reaſon and the will; only it has two faces, that turned towards reaſon bearing the effigy of truth, but that towards action, the effigy of goodneſs, yet ſo as to appear the effigies of ſiſters.

Mr. Boyle ſays, that there are many inſtances in phyſical-books of diſeaſes ariſing from imagination, particularly where the diſeaſe is exceſſively dreaded; adding, that he knew a lady who had the ſmall-pox by this means: nor is it only in women that imagination has theſe effects, for he tells us of a man whoſe hair was ſuddenly changed from a fear of his going to be put to death. The remembrance of a lothſome potion will often produce a horror, attended with a ſenſible commotion of the whole body, and a kind of convulſion about the ſtomach. Shame, we ſee, occaſions the blood to be plentifully thrown up into the face, as will alſo great and ſudden joy. Longing in women may be ſuppoſed to create great alterations in the body of the mother, ſince it will leave ſuch laſting and ſtrong impreſſions upon that of the infant. And Mr. Boyle tells us of a young lady who waſhing in St. Winifred's well, and fixing her eyes very attively upon the red pebble-ſtones which in a ſcattered order made a large part of thoſe that appeared through the water, a while afterwards grew big, went her time, and was delivered of a child, whoſe ſkin was plentifully ſpeckled with ſpots of the colour and magnitude of theſe ſtones. We have had lately an ingenious poem, in Engliſh, upon the pleaſures of the imagination; and Addiſon's eſſays upon that ſubject in the Spectator, as well as Hutchinſon's treatiſe on beauty and virtue, deſerve the attention of ſuch as deſire to be informed in this branch of philoſophy.

MAM, a name applied by the mahometans to him who is head of the congregations in their moſques; and by way of eminence to him who has the ſupreme authority both in reſpect to ſpirituals and temporals.

There are ſubordinate imams in each town who repreſent the chief imam, but only with reſpect to religion. When the imam of the muſſulman religion is mentioned without diſtinction, it is always reſtricted to the rightful and lawful ſucceſſor of Mahomet, the fountain both of ſecular and ſacred juriſdiction. The mahometans are not perfectly agreed concerning the dignity of ſome of the circumſtances of this office: ſome hold the imamate to be ſettled by divine right, like the aaronical prieſthood, in one family: others think it not ſo unalterably tied to genealogy and deſcent, as to hinder its paſſing from one family to another; and they ſay that an imam may be depoſed for vicious conduct, and his office conferred to another.

The ſchiites, or diſciples of Ali, maintain, that this privilege belongs to the family of Ali excluſive of all others; Ali being ſole heir to Mahomet: hence, they own no perſon for the head of religion, who cannot prove his deſcent in a right line from this firſt imam. There are imams belonging to particular moſques, who are in the nature of our pariſh-prieſts.

MBARGO, or EMBARGO, in naval affairs. See the article EMBARGO.

MBECILITY, a languid, infirm ſtate of body, which, being greatly impaired, is not able to perform it uſual exerciſes and functions.

MBEZLE, ſignifies to ſteal, pilfer, or purloin, and alſo to waſte or diminiſh goods, &c. entruſted to a perſon's charge and care. Imbezlers of wool forfeit double damages, and may be committed to the houſe of correction till paid; and ſervants embezling their maſter's goods to the value of 40 s are deemed guilty of felony without benefit of clergy.

IMBIBING, the action of a dry porous body, that abſorbs or takes up a moiſt or fluid one: thus, ſugar imbibes water; a ſpunge, the moiſture of the air, &c.

IMBRICATED, among botaniſts, an appellation given to ſuch leaves of plants, as are placed over one another like the tiles of a houſe.

The term imbricated is likewiſe applied to ſome of the heart-ſhells, from their being rigid tranſverſely in the ſame manner.

IMENSTAT, a town of Germany, in the circle of Swabia, ſituated in eaſt long. 10° 8′, north lat. 47° 25′.

IMITATION, in literary matters, the act of doing or ſtriving to copy after, or become like to, another perſon or thing.

Du Bos obſerves, that the principal merit of poems and pictures, conſiſts in the imitation of ſuch objects as would have excited real paſſions; and that the paſſions which theſe imitations give riſe to, are only ſuperficial, and not ſo ſtrong as that of the object imitated, and are therefore ſoon effaced. He alſo maintains, that the imitation of tragic objects in poems and pictures, afford moſt pleaſure: we liſten, therefore, with pleaſure to thoſe unhappy men who make a recital of their misfortunes by means of a painter's pencil, or of a poet's verſes; but, as Diogenes Laertius obſerves, it would afflict us extremely, were we to hear them bewailing their ſad diſaſters in perſon. The too great impreſſions theſe imitations make upon man, was the reaſon of Plato's excluding them from his republic. Poets and painters cannot chooſe too engaging a ſubject for their imitation, ſince the principal charm of theſe two arts, as Du Bos obſerves, proceeds from the imitation of objects capable of engaging us.

Imitation, ſays he, ought not to be ſervile, but like that which Horace, Virgil, and many other good writers made uſe of, who preceded them; that is, by following the genius of the language in which they compoſed, and taking nature for their firſt model.

IMITATION, in muſic, a particular way of compoſition wherein each part is made to imitate the other, either throughout the whole piece, which is one of the kinds of canon; or only during ſome meaſures, which is a ſimple imitation.

Sometimes the motion or figure of the notes is only imitated, and that often by a contrary motion, which makes what they call a retrograde imitation.

Imitation differs from a fugue, ſays Mr. Broſſard, in regard in the former the repetition muſt be a ſecond, third, ſixth, ſeventh, or ninth, either above or below the firſt voice or guide; to which it may be added, that it may be at any interval, and differs properly from fugue, in that in imitation the intervals may not be preciſely the ſame; whereas were the repetition to an uniſon, fourth, fifth, or octave, higher or lower, and the intervals exactly the ſame in the comes and guido, it would be a fugue.

IMMACULATE, ſomething without ſtain, chiefly applied to the conception of the holy virgin. See CONCEPTION.

IMMANENT, in logic. The ſchoolmen diſtinguiſh two kinds of actions, the one tranſient, which paſs from the agent to the patient, the other immanent, which continue in the agent. See ACT.

IMMATERIAL, ſomething devoid of matter, or that is pure ſpirit: thus God, angels, and the human ſoul are immaterial beings. See the articles GOD, ANGEL, and SOUL.

IMMEDIATE, whatever is capable of producing an effect without the intervention of external means; thus we ſay, an immediate cauſe, in oppoſition to a mediate or remote one. See CAUSE.

IMMEDIATE MODE. See MODE.

IMMEMORIAL, in law, an epithet given to the time or duration of any thing, whoſe beginning we know nothing of.

In a legal ſenſe, a thing is ſaid to be of time immemorial, or time out of mind, that was before the reign of king Edw. II.

IMMENSITY, an unlimited extenſion, or which no finite and determinate ſpace, repeated ever ſo often, can equal.

IMMERETTA, a province of Aſiatic Turky, ſituated between Georgia and the Euxine ſea.

IMMERSION, that act by which any thing is plunged into water, or other fluid. See the article FLUID.

It is uſed in chemiſtry for a ſpecies of calcination, when any body is immerſed in a fluid to be corroded; or it is a ſpecies of lotion, as when a ſubſtance is plunged into any fluid in order to deprive it of a bad quality, or communicate to it a good one.

IMMERSION, in aſtronomy, is when a ſtar or planet is ſo near the ſun with regard to our obſervations, that we cannot ſee it; being, as it were, enveloped and hid in the rays of that luminary. It alſo denotes the beginning of an eclipſe of the moon, or that moment when the moon begins to be darkened, and to enter into the ſhadow of the earth; and the ſame term is alſo uſed with regard to an eclipſe of the ſun, when the diſk of the moon begins to cover it. In this ſenſe emerſion ſtands oppoſed to immerſion, and ſignifies the moment wherein the moon begins to come out of the ſhadow of the earth, or the ſun begins to ſhew the parts of his diſk which were hid before. See the article ECLIPSE.

Immerſion is frequently applied to the ſatellites of Jupiter, and eſpecially to the firſt ſatellite; the obſervation whereof is of ſo much uſe for diſcovering the longitude. The immerſion of that ſatellite is the moment in which it appears to enter within the diſk of jupiter, and its emerſion the moment when it appears to come out.

The immerſions are obſerved from the time of the conjunction of jupiter with the ſun, to the time of his oppoſition and the emerſions from the time of his oppoſition to his conjunction.

The peculiar advantage of theſe obſervations is, that during eleven months of the year, they may be made at leaſt every other day. The perfection of this theory and the praxis thereon, we owe to Mr. Caſſini.

IMMORTAL, that which will laſt to all eternity; as having in it no principle of alteration or corruption: thus God and the human ſoul are immortal. See the articles GOD and SOUL.

IMMUNITY, a privilege or exemption from ſome office, duty, or impoſition, as an exemption from tolls, &c.

Immunity is more particularly underſtood of the liberties granted to cities and communities.

IMMUTABILITY, one of the divine attributes, founded on the abſolute perfection of the deity. See GOD.

The immutability of God is two-fold, phyſical and moral. The firſt conſiſts in this, that the divine eſſence does not, nor poſſibly can, receive any alteration; and the moral immutability is founded on the perfection of his nature, whereby he

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he always wills the ſame things, or ſuch as are beſt on the whole.

MOLA, a city of Italy, ſeventeen miles eaſt of Bologna, ſubject to the pope.

MPALED, in heraldry; when the coats of a man and his wife who is not an heireſs are borne in the ſame eſcutcheon, they muſt be marſhalled in pale; the huſband's on the right ſide, and the wife's on the left: and this the heralds call baron and feme, two coats impaled.

If a man has had two wives, he may impale his coat in the middle between theirs; and if he has had more than two, they are to be marſhalled on each ſide of his in their proper order.

MPALPABLE, that whoſe parts are ſo extremely minute that they cannot be diſtinguiſhed by the ſenſes, particularly by that of feeling.

MPANATION, a term uſed by divines, to ſignify the opinion of the lutherans with regard to the euchariſt, who believe that the ſpecies of bread and wine remain together with the body of our Saviour after conſecration.

MPANELLING, in law, ſignifies the writing down or entering into a parchment, liſt or ſchedule, the names of a jury ſummoned by the ſheriff to appear for ſuch public ſervices as juries are employed in. See the article PANNEL.

MPARLANCE, in law, a petition in court for a day to conſider or adviſe what anſwer the defendant ſhall make to the plaintiff's action; and is the continuance of the cauſe till another day, or a longer time given by the court.

An imparlance is general or ſpecial; general is when it is entered in general terms, without any ſpecial clauſe therein; ſpecial is where the defendant deſires a further day to anſwer. And this laſt imparlance is of uſe to plead ſome matters, which cannot be pleaded after a general imparlance.

It is ſaid that imparlance was formerly from day to day, but now it is from one term to another. In caſe the plaintiff amends his declaration after the ſame is delivered or filed, the defendant may in courſe imparl to the next term afterwards, unleſs the plaintiff pays coſts; but if he does, and they are accepted, the defendant may not have an imparlance. Likewiſe the not delivering a declaration in time, is ſometimes the cauſe of imparlance; and when the plaintiff declares, yet does not proceed in three terms after, in ſuch caſe the defendant may imparl to the next ſucceeding term.

But there are divers caſes wherein imparlances are not to be given, as where a perſon is ſued by an attorney or any other privileged perſon of the court in an aſſize, one may not imparl except good cauſe be given, nor ſhall there be imparlance in action of ſpecial clauſum fregit, *&c.*

IMPARSONNEE, or parſon imparſonee, in law. See the article PARSON.

IMPASSIBLE, that which is exempt from ſuffering, or cannot undergo pain or alteration.

The ſtoics place the ſoul of their wiſe man in an impaſſible, or imperturbable ſtate. See the article STOICS.

IMPASTATION, the mixtion of various materials of different colours and conſiſtencies, baked or bound together with ſome cement, and hardened either by the air or by fire.

IMPASTATION, in maſonry, a term uſed for a work made of ſtuc, or ſtone, beaten and wrought up in manner of a paſte.

Some authors are of opinion, that the obeliſks and the huge antique columns ſtill remaining, were made by impaſtation.

IMPASTING, or EMPASTING, in painting. See the article EMPASTING.

IMPATIENS, TOUCH-ME-NOT, in botany, a genus of plants otherwiſe called balſamina. See BALSAMINA.

This plant is ſaid to be ſo ſtrong a diuretic, as to bring on a diabetes.

IMPEACHMENT, an accuſation and proſecution for treaſon and other crimes and miſdemeanors. Any member of the lower houſe of parliament may impeach any one belonging either to that body, or to the houſe of lords. The method of proceeding, is to exhibit articles on the behalf of the commons, by whom managers are appointed to make good their charge. Theſe articles are carried to the lords, by whom every perſon impeached by the commons is always tried; and if they find him guilty no pardon under the great ſeal can be pleaded to ſuch an impeachment. 12 Will. III. cap. ii.

IMPEACHMENT *of waſte*, is a prohibition or reſtraint from committing of waſte upon lands or tenements. This term alſo ſignifies a demand of ſatisfaction for waſte committed by a tenant, who has only a particular eſtate in the land granted, as for life or years. Yet a perſon that holds lands on leaſe containing this clauſe, *viz.* to hold without impeachment of waſte, has thereby ſuch an intereſt in the lands, *&c.* that he may commit waſte without being impeached or queſtioned for it.

IMPEDIMENTS, in law, are ſuch hindrances as put a ſtop, or ſtay, to a perſon's ſeeking for his right by due courſe of law.

Perſons under impediments are thoſe that are either under age, or under cover, that are non compos mentis, in priſon, beyond ſea, *&c.* who by our ſtatutes are allowed time to claim and proſecute their rights, after ſuch impediments are removed, eſpecially in caſe of fines levied.

IMPENETRABILITY, in philoſophy, that property of body, whereby it cannot be pierced by another: thus, a body, which ſo fills a ſpace as to exclude all others, it is ſaid to be impenetrable. See the articles BODY, EXTENSION, *&c.*

IMPERATIVE, one of the moods of a verb, uſed when we would command, entreat or adviſe: thus, *go, read, take pity, be adviſed,* are imperatives in our language; but in the learned languages, this mood has a peculiar termination to diſtinguiſh it from others, as *i,* or *ito, go*; *lege,* or *legito, read, &c.* and not only ſo, but the termination varies, according as you addreſs one or more perſons, as *audi* and *audite*; ακȣέτω, ακȣέτων, ακȣέτωσαν, *&c.*

IMPERATOR, in roman antiquity, a title of honour conferred on victorious generals, by their armies, and afterwards confirmed by the ſenate.

IMPERATORIA, MASTER-WORT, in botany, a genus of the pentandria-digynia claſs of plants, the general corolla of which is uniform; the ſingle flowers are compoſed each of five inflexo-cordate and nearly equal petals; the fruit is naked, round, compreſſed, and ſeparable into two parts; the ſeeds are two, oval, furrowed with two lines on one ſide, and ſurrounded with a broad margin.

The root of this plant is cordial and ſudorific, and is an ingredient in many compoſitions.

IMPERFECT, ſomething that is defective, or that wants ſome of the properties found in other beings of the ſame kind: thus moſſes are called imperfect plants, becauſe almoſt all the parts of fructification are wanting in them; and for the like reaſon, is the appellation imperfect given to the fungi and ſubmarine plants. See the articles MOSS and FUNGUS.

IMPERFECT FLOWERS, thoſe otherwiſe called ſtamineous. See the article ST MINEOUS.

IMPERFECT NUMBERS, ſuch whoſe aliqu parts taken together, do either exce or fall ſhort of that whole number which they are parts: they are eith abundant or deficient. See the articl ABUNDANT and DEFICIENT.

IMPERFECT TENSE, in grammar, a ten that regards ſome præterite tenſe, or d notes the thing to be at that time pr ſent, and not quite finiſhed; as *ſcrib bam, I was writing.*

IMPERIAL, ſomething belonging to emperor or empire, as imperial crow imperial chamber, imperial cities, imp rial diet, *&c.* See CROWN, CHAMBE CITY, DIET, *&c.*

IMPERIAL is alſo a city and port-town the province of Chili, in South Americ ſituated in weſt longitude 80°, north l titude 39°.

IMPERSONAL VERB, in grammar, verb to which the nominative of any ce tain perſon cannot be prefixed; or, others define it, a verb deſtitute of t two firſt and primary perſons, as *dec oportet, &c.* The impersonal verbs the active voice end in *t,* and thoſe of t paſſive in *tur*; they are conjugated thr the third perſon ſingular of almoſt all t tenſes and moods: they want the imp rative, inſtead of which we uſe the pr ſent of the ſubjunctive; as *pœnitea pugnetur*; nor, but a few excepted, a they to be met with in the ſupines, pa ticiples, or gerunds.

IMPERVIOUS, a thing not to be pe vaded, nor paſſed through, either by re ſon of the cloſeneſs of its pores, or t particular configuration of its parts.

IMPETIGO, in medicine, a name which the leproſy of the Greeks is ſom times called. See LEPROSY.

IMPETIGO is alſo a ſpecies of itch, atten ed with dry ſcales or ſcurf, and an unea pruriginous itching. See ITCH.

IMPETRATION, in law, the obtai ing any thing by requeſt or prayer: b in our old ſtatutes, it is taken for the pr obtaining of church benefices in th realm, from the court of Rome, whi lie in the diſpoſition and gift of the ki and other lay-patrons of this land.

IMPETUS, in mechanics, the force wi which one body impels or ſtrikes a other. See the articles MOMENTU GUNNERY, *&c.*

IMPING, in falconry, the inſerting of

feath

feather in the wing of an hawk, in the place of one that is broken.

IMPLANTATION, the ſame with tranſplantation. See TRANSPLANTATION.

IMPLEAD ſignifies to ſue or proſecute by due courſe of law.

IMPLEMENTS is uſed for all things neceſſary for a trade, or the furniture of an houſhold; in which ſenſe, it is frequently uſed in wills, conveyances of moveables, *&c.*

IMPLICITE, ſomething tacitly compriſed or underſtood; that is, contained in a diſcourſe, clauſe, or propoſition, not in expreſs terms, but only by induction and conſequence.

IMPLICATION, in law, is where ſomething is implied, that is not expreſſed by the parties themſelves in their deeds, contracts, and agreements.

In this caſe, the want of words may be ſupplied by implication. Thus, where a huſband by will deviſes all the goods in his houſe, to his wife; and after her deceaſe, bequeaths his houſe and thoſe goods to his ſon, it is implied, in law, that the widow is to have the houſe for life; becauſe though the ſon might have had it, he is not mentioned by will to have any thing till after the deceaſe of the mother. But it is otherwiſe, where a perſon deviſes part of his lands to his wife for life, and the part ſo deviſed, with all the reſt of his lands to the youngeſt ſon, and his heirs, after the wife's deceaſe: in this caſe, as there is no expreſs deviſe of the reſt of the lands to the wife, ſhe cannot have them by implication; for ſince the eldeſt ſon, who is heir at law, is not excluded, he ſhall have them during his mother's life, and till the deviſe to the youngeſt ſon takes effect.

IMPORTATION, in commerce, the bringing merchandize into a kingdom from foreign countries; in contradiſtinction to exportation. See EXPORTATION.

We ſhall here give ſome of the principal laws relating to the importation of goods into this kingdom. Goods imported without entry, or paying cuſtoms, are forfeited; and the lord-treaſurer, the barons of the exchequer, or chief magiſtrates of the place where the offence was committed, or next adjoining to it, may grant a warrant to any perſon, who, with the aſſiſtance of a conſtable, may break open doors, cheſts, *&c.* and take thence any prohibited or unaccuſtomed goods; but this is to be done, within one month after the offence was committed. But if falſe information is given, the perſon wrongfully accuſed, may recover coſts and damages. See the article DUTY.

No ſhip or veſſel arriving from beyond ſea is to be above three days in ſailing from Graveſend to the place of diſcharge on the river Thames, unleſs hindered by contrary winds or other impediment. And no ſhip bound for the port of London is to touch or ſtay at any place adjoining to any ſhore, between Graveſend and Cheſter-quay. True entries are to be made of all ſuch ſhips lading, upon oath of the maſter or purſer for that voyage; alſo where ſhe took in her lading, where ſhe was built, how manned, who were the owners, and who the maſter during the voyage. In all out-ports, ſhips are to come directly to the place of unlading, and make true entries as aforeſaid, upon penalty of the forfeiture of 100 l.

After any ſhip is cleared, and the watchmen and tideſmen diſcharged from their attendance, if there be found on board any concealed goods that have not paid the duty inwards, the maſter, or other perſon taking charge of the ſhip, ſhall forfeit 100 l.

Porters, carmen, watermen, *&c.* aſſiſting in landing unaccuſtomed goods, ſhall, on conviction, for the firſt offence, be committed to the next jail till they find ſecurity for their good behaviour; and for their ſecond offence, they are to be committed to priſon for two months, without bail or mainprize, or till they are diſcharged by the court of exchequer, or each of them pay 5 l. to the ſheriff of the county.

No merchant-denizen ſhall cover a ſtranger's goods, but ſhall, by himſelf or agent, ſign one of his bills of every entry, with the mark, number, and contents of every parcel of goods, without which no entry ſhall paſs. And no children of aliens under the age of twenty-one years, ſhall have entry made in their names, nor be admitted to trade.

Merchants, trading into the port of London, ſhall have free liberty to lade and unlade their goods at any of the lawful quays between the Tower and London-bridge, from ſun-riſing to ſun-ſetting, from September 10, to March 10; and between ſix o'clock in the morning and ſix in the evening, from March 10, to September 10; giving notice thereof to the reſpective officers, appointed to attend the lading and unlading of goods. And ſuch officers as ſhall refuſe to be preſent, ſhall forfeit 5l. for every default.

To prevent combination between importers, and ſeizers of goods unlawfully imported or exported, none ſhall ſeize them but the officers of the cuſtoms, or ſuch as ſhall be authoriſed ſo to do by the lord treaſurer, under treaſurer, or a ſpecial commiſſion from his majeſty, under the great or privy ſeal.

If any ſeizer of prohibited or unaccuſtomed goods does not make due proſecution thereof, it is lawful for the cuſtom-houſe officers, or others deputed thereto, to make ſeizure of ſuch goods, and they ſhall be, in law, adjudged the firſt true informers and ſeizers, and have the benefit thereof, notwithſtanding any law and ſtatute to the contrary.

All foreign goods permitted to be landed by bills at ſight, bills at view or ſuffrance, ſhall be landed at the moſt convenient quays and wharfs, as the officers of the cuſtoms ſhall direct; and there, or at the king's ſtorehouſe of the reſpective ports, ſhall be meaſured, weighed, numbered, &c. by the officers appointed, who ſhall perfect the entry, and ſubſcribe their names to it, and the next day make their report to the cuſtomer, collector, or comptroller; or in default thereof, ſhall forfeit 100l.

Any merchant who ſhall import goods, ſhall have liberty to break bulk in any lawful port or quay, the maſter or purſer firſt making oath of the true contents of the ſhip's lading. No engliſh merchant ſhall put on ſhore in Scotland or Ireland, any merchandize of the growth or produce of any of his majeſty's plantations, unleſs the ſame have been firſt landed in England, Wales, or Berwick, and paid the duties with which they are chargeable, under the penalty of forfeiting the ſhip and goods, three fourths to the king, and one fourth to the informer, or he that ſhall ſue for the ſame: but if a ſhip be diſabled, or driven into any port of Ireland, and unable to proceed on her voyage, her goods may be put on ſhore, under the hands of the principal officers of the cuſtoms there reſiding, till the goods can be put on board ſome other veſſel, to be tranſported to ſome part of England or Wales.

Natives of England or Ireland may import into England, directly from Ireland, any hemp, flax, thread, yarn, and linen, of the growth and manufacture of Ireland, cuſtom-free; the chief officer ſo importing bringing a certificate from th chief office in Ireland, expreſſing the particulars of the goods, with the names and places of abode of the exporters thence and of ſuch as have ſworn that the ſaid goods are, bona fide, of the growth and manufacture of that kingdom, and who they are conſigned to in England; and the chief officers ſhall make oath, that the ſaid goods are the ſame that are on board, by virtue of that certificate.

IMPOSITION *of hands*, a religious ceremony, in which a biſhop lays his hand upon the head of a perſon, in ordination confirmation, or in uttering a bleſſing This practice is alſo generally obſerved by the diſſenters at the ordination of their miniſters, when all the miniſters preſent place their hands upon the head of him whom they are ordaining, while one of the body prays for a bleſſing on him and his future labours.

Impoſition of hands was a jewiſh ceremony, introduced not by any divine authority, but by cuſtom; it being the practice of thoſe people, whenever they prayed for any perſon, to lay their hands on his head. Our Saviour obſerved the ſame ceremony both when he conferred his bleſſing on the children, and when he cured the ſick: the apoſtles alſo laid hands on thoſe, upon whom they conferred the Holy Ghoſt. In the antient church, impoſition of hands was even practiſed in marriage, which cuſtom is ſtill obſerved by the Abyſſinians.

However, the uſe of this term, which in its original ſignification was general, is now reſtrained, by cuſtom, to the laying on of hands practiſed in ordination.

IMPOSSIBLE, that which cannot be done or effected.

A propoſition is ſaid to be impoſſible, when it contains two ideas, which mutually deſtroy each other, and which can neither be conceived nor united together in the mind: thus, it is impoſſible, that a circle ſhould be a ſquare, becauſe we conceive clearly that ſquareneſs and roundneſs deſtroy each other by the contrariety of their figure.

Impoſſibilities are of three kinds, *viz.* metaphyſical, phyſical, and moral. A thing is metaphyſically impoſſible, when it cannot be done even by divine power; as that a ſquare ſhould be round, &c. thoſe ideas, as was already obſerved, deſtroy each other, imply a contradiction, and are, ſtrictly ſpeaking, nothing at all, in regard that what is affirmed, is at the ſame time denied: this impoſſibility is otherwiſe termed abſolutely impoſſible.

A thing is ſaid to be phyſically impoſſible, that cannot be done by any natural powers, as the reſurrection of the dead: this is otherwiſe termed *impoſſibile creaturæ*, or impoſſible with regard to the creature.

A thing is morally impoſſible, when, of its own nature, it is poſſible; but yet is attended with ſuch difficulties, as that, all things conſidered, it appears impoſſible: thus, it is morally impoſſible that all men ſhould be virtuous, or that a man ſhould throw the ſame number with three dice an hundred times ſucceſſively.

But with greater propriety a thing is ſaid to be morally impoſſible, when it is repugnant to good ſenſe and decency, or contrary to the laws of nature: thus the lawyers ſay, *omne turpe eſt impoſſibile*: theſe conditions are impoſſible, therefore, which ſenſe and decorum do not allow to be performed, though in themſelves very poſſible to thoſe who have no regard to good ſenſe, *&c.*

IMPOST, in law, ſignifies in general a tribute or cuſtom, but is more particularly applied to ſignify that tax which the crown receives for merchandizes imported into any port or haven. See DUTY. Some, notwithſtanding, diſtinguiſh impoſts from cuſtoms, which laſt are rather the profits ariſing to the king from goods exported. See the article CUSTOMS.

IMPOSTS, in architecture, the capitals of pillars, or pilaſters, which ſupport arches. An impoſt, ſometimes called chaptrel, is a ſort of a plinth, or little corniche, which crowns a pier, and ſupports the firſt ſtone whence an arch or vault commences. The impoſts are conformable to their proper orders. The tuſcan has only a plinth; the doric has two faces crowned; the ionic, a larmier, or crown over the two faces, and its mouldings may be carved; the corinthian and compoſite have a larmier, frieze, and other mouldings. See the articles TUSCAN, DORIC, *&c.*

The projectures of the impoſts muſt not exceed the naked of the pilaſter: ſometimes the entablature of the order ſerves for the impoſt of the arch, and this has a very grand and ſtately appearance. The impoſt is a thing very eſſential to the compoſition of the ordonnances, inſomuch that without it, in the place where the curve line of the arch meets with the perpendicular line of the pillar, there always ſeems a kind of elbow.

IMPOSTHUME, in ſurgery, *&c.* the ſame with abſceſs. See ABSCESS.

IMPOTENCE, or IMPOTENCY, in general, denotes want of ſtrength, power, or means to perform any thing.

Divines and philoſophers diſtinguiſh two ſorts of impotency, natural and moral; the firſt is a want of ſome phyſical principle, neceſſary to an action; or where a being is abſolutely defective, or not free and at liberty to act: the ſecond only imports a great difficulty, as a ſtrong habit to the contrary, a violent paſſion, or the like.

Impotency is, more particularly, uſed for a natural inability to coition. Impotence with reſpect to men, is the ſame as ſterility in women; that is, an inability of propagating the ſpecies. There are many cauſes of impotence, as a natural defect in the organs of generation, which ſeldom admits of a cure: accidents, diſeaſes; and in ſuch caſes the impotence may, or may not be remedied, according as theſe are curable or otherwiſe. But there is reaſon to believe that the moſt frequent cauſes of impotence are prepoſterous methods of venery, and too often repeated venereal injuries. See the article GONORRHOEA.

Dr. James thinks that a ſudden impotence happening to a man not accuſtomed to any diſorders of that kind, and not accountable for from any preceding accidents, is a fore-runner of ſome great diſorder; and that, in ſuch caſes, provocatives are very dangerous, becauſe it is poſſible they may increaſe the diſorder which cauſes the impotence, and make it fatal. Hippocrates adviſes a man who has a mind to get children, not to get drunk, nor drink white-wine, but that which is ſtrong and unmixed, nor to uſe the warm bath.

Another principal cauſe of impotence is the vicious habit of drinking ſpirits, that is, drams and the like.

IMPRACTICABLE CASE, in algebra, that otherwiſe called irreducible. See the article IRREDUCIBLE CASE.

IMPRECATION, a curſe, or wiſh that evil may befal any one. See the article EXECRATION.

IMPREGNATION, the getting a woman with-child. See PREGNANCY.

The term impregnation is alſo uſed, in pharmacy, for communicating the virtues of one medicine to another, whether by mixture, coction, digeſtion, &c.

IMPRESSION is applied to the ſpecies of objects, which are ſuppoſed to make ſome mark or impreſſion on the ſenſes, the mind, and the memory.

The peripatetics aſſert, that bodies emit ſpecies reſembling them, which are conveyed to the common ſenſorium, and there are rendered intelligible by the active intellect; and when thus ſpiritualized, are called expreſſions, or expreſs ſpecies, as being expreſſed from the others.

IMPRESSION alſo denotes the edition of a book, regarding the mechanical part only; whereas edition, beſides this, takes in the care of the editor, who corrected or augmented the copy, adding notes, &c. to render the work more uſeful. See the article EDITOR.

IMPREST, *Auditors of.* See AUDITOR.

IMPREST-MONEY, the money paid at the enliſting of ſoldiers.

IMPRISONMENT, the ſtate of a perſon reſtrained of his liberty, and detained under the cuſtody of another.

No perſon is to be impriſoned but as the law directs, either by the command or order of a court of record, or by lawful warrant; or the king's proceſs, on which one may be lawfully detained. And at common law, a perſon could not be impriſoned unleſs he were guilty of ſome force and violence, for which his body was ſubject to impriſonment, as one of the higheſt executions. Where the law gives power to impriſon, in ſuch caſe it is juſtifiable, provided he that does it in purſuance of a ſtatute, exactly purſues the ſtatute in the manner of doing it, for otherwiſe it will be deemed falſe impriſonment, and of conſequence it is unjuſtifiable. Every warrant of commitment for impriſoning a perſon, ought to run, "Till delivered by due courſe of law," and not "Until farther order;" which has been held ill, and thus it alſo is, where one is impriſoned on a warrant not mentioning any cauſe for which he is committed.

A perſon being ſent to priſon by a warrant from a ſecretary of ſtate, without aſſigning any cauſe, &c. it was adjudged, that he ought to be diſcharged for that reaſon. Perſons may alſo, by bail or habeas corpus, be diſcharged from their impriſonment in any caſe bailable. See the articles HABEAS CORPUS, BAIL, PRISON, and PRISONER.

IMPROPER FRACTIONS, in arithmetic. See the article FRACTION.

IMPROPRIATION, a parſonage or eccleſiaſtical living, the profits of which are in the hands of a layman; in which ſenſe, it ſtands diſtinguiſhed from appropriation, which is where the profits of a benefice are in the hands of a biſhop, college, &c. though theſe terms are now often uſed promiſcuouſly. See the article APPROPRIATION.

IMPULSE, or IMPULSIVE FORCE, in mechanics, the ſame with impetus. See the article IMPETUS.

IMPURITY, in the law of Moſes, is any legal defilement. Of theſe there were ſeveral ſorts; ſome were voluntary, as the touching a dead body, or any animal that died of itſelf, or any creature that was eſteemed unclean; or the touching things holy, by one who was not clean, or was not a prieſt; the touching one who had a leproſy, one who had a gonorrhœa, or who was polluted by a dead carcaſe, &c. Sometimes theſe impurities were involuntary, as when any one inadvertently touched bones, or a ſepulchre, or any thing polluted; or fell into ſuch diſeaſes as pollute, as the leproſy, &c.

The beds, cloaths, and moveables which had touched any thing unclean, contracted alſo a kind of impurity, and in ſome caſes communicated it to others. Theſe legal pollutions were generally removed by bathing, and laſted no longer than the evening. The perſon polluted plunged over head in the water, and either had his cloaths on when he did ſo, or waſhed himſelf and his cloaths ſeparately. Other pollutions continued ſeven days, as that which was contracted by touching a dead body. That of women in their monthly courſes laſted till this was over with them. Other impurities laſted forty or fifty days, as that of women who were lately delivered, who were unclean forty days after the birth of a boy, and fifty after the birth of a girl. Others again laſted till the perſon was cured. Many of theſe pollutions were expiated by ſacrifices; and others by a certain water or lye, made with the aſhes of a red heifer, ſacrificed on the great day of expiation. When the leper was cured, he went to the temple, and offered a ſacrifice of two birds, one of which was killed, and the other ſet at liberty. He who had touched a dead body, or had been preſent at a funeral, was to be purified with the water of expiation, and this upon pain of death. The woman who had been delivered, offered a turtle and a lamb for her expiation; or if ſhe was poor, two turtles or two young pigeons.

Theſe impurities, which the law of Moſes has expreſſed with the greateſt accuracy and care, were only figures of other more important impurities, ſuch as the ſins and iniquities committed againſt God, or faults committed againſt our neighbour. The ſaints and prophets of the Old Teſtament were ſenſible of this; and our Saviour, in the goſpel, has ſtrongly inculcated, that they are not outward and corporeal pollutions which render us unacceptable to God, but ſuch inward pollutions as infect the ſoul, and are violaations of juſtice, truth, and charity.

IMPUTATION, in general, the charging ſomething to the account of one, which belonged to another: thus, the aſſertors of original ſin maintain, that Adam's ſin is imputed to all his poſterity. See the article ORIGINAL SIN.

In the ſame ſenſe, the righteouſneſs and merits of Chriſt are imputed to true believers.

INACCESSIBLE, ſomething that cannot be come at, or approached, by reaſon of intervening obſtacles, as a river, rock, *&c.* It is chiefly uſed in ſpeaking of heights and diſtances. See the articles HEIGHT and DISTANCE.

INACTIVITY *of matter.* See INERTIA.

INADEQUATE IDEA. See IDEA.

INALIENABLE, that which cannot be legally alienated or made over to another: thus the dominions of the king, the revenues of the church, the eſtates of a minor, *&c.* are inalienable, otherwiſe than with a reſerve of the right of redemption.

INAMBLUCIÆ, in natural hiſtory, a genus of ſelenitæ, of a columnar, abrupt, and ſeemingly fibroſe texture. See the article SELENITÆ.

There are only two known ſpecies of this genus, *viz.* the inamblucia, with very fine filaments, and that with whitiſh and black filaments.

INAMELLING, or ENAMELLING. See the article ENAMELLING.

INANIMATE, a body that has either loſt its ſoul, or that is not of a nature capable of having any.

INANITION, among phyſicians, denotes the ſtate of the ſtomach when empty, in oppoſition to repletion.

INARCHING, in gardening, is a method of grafting, commonly called grafting by approach, and is uſed when the ſtock intended to graft on, and the tree from which the graft is to be taken, ſtand ſo near, or can be brought ſo near, that they may be joined together. The method of performing it, is as follows: take the branch you would inarch, and having fitted it to that part of the ſtock where you intend to join it, pare away the rind and wood on one ſide, about three inches in length. After the ſame manner cut the ſtock or branch in the place where the graft is to be united, ſo that the rind of both may join equally together; then cut a little tongue upwards in the graft, and make a notch in the ſtock to admit it; ſo that when they are joined, the tongue will prevent their ſlipping, and the graft will more cloſely unite with the ſtock. Having thus placed them exactly together, tie them with ſome baſs, or other ſoft tying; then cover the place with grafting clay, to prevent the air from entering to dry the wound, or the wet from getting in to rot the ſtock: you ſhould alſo fix a ſtake in the ground, to which that part of the ſtock, together with the graft, ſhould be faſtened, to prevent the wind from breaking them aſunder, which is often the caſe, when this precaution is not obſerved. In this manner they are to remain about four months, in which time they will be ſufficiently united, and the graft may then be cut from the mother tree, obſerving to ſlope it off cloſe to the ſtock; and if at this time you cover the joined parts with freſh grafting-clay, it will be of great ſervice to the graft.

This operation is always performed in April or May, and is commonly practiſed upon myrtles, jaſmines, walnuts, firs, pines, and ſeveral other trees that will not ſucceed by common grafting, or budding.

INAUGURATION, the coronation of an emperor or king, or the conſecration of a prelate; ſo called from the ceremonies uſed by the Romans, when they were received into the college of augurs. See CORONATION, CONSECRATION, *&c.*

INCA, or YNCA, a name given by the natives of Peru to their kings, and the princes of the blood. Pedro de Ciéça, in his Chronicle of Peru, gives the origin of the incas, and ſays, that that country was, for a long time, the theatre of all manner of crimes, of war, diſſention, and the moſt dreadful diſorders, till at laſt two brothers appeared, one of whom was called Mangocapa; of this perſon, the Peruvians relate many wonderful ſtories. He built the city of Cuſco, made laws, eſtabliſhed order and harmony by his wiſe regulations, and he and his deſcendants took the name of inca, which ſignifies king or great lord. Theſe incas became ſo powerful, that they rendered themſelves maſters of all the country from Paſto to Chili, and from the river Maule on the ſouth, to the river Augaſmago, on the north; theſe two rivers forming the bounds of their empire, which extended above thirteen hundred leagues in length. This they enjoyed till the diviſions between inca Guaſcar and Atabalipa, which the Spaniards laying hold of, made themſelves maſters of the country, and deſtroyed the empire of the incas.

INCAMERATION, a term uſed in the chancery of Rome, for the uniting of lands, revenues, or other rights, to the pope's domain.

INCANTATION, denotes certain ceremonies, accompanied with a formula of words, and ſuppoſed to be capable of raiſing devils, ſpirits, *&c.* See the articles, CHARM, CARMEN, *&c.*

INCAPACITY, in the canon-law, is of two kinds: 1. The want of a diſpenſation for age in a minor, or legitimation in a baſtard, and the like: this renders the proviſion of a benefice void in its original. 2. Crimes and heinous offences, which annul proviſions at firſt valid.

INCARNATION, in theology, the act whereby the ſecond perſon of the holy Trinity aſſumed the human nature, *viz.* a true body and reaſonable ſoul, in order to accompliſh the redemption of fallen mankind.

This fundamental doctrine of chriſtianity is very expreſly taught in ſcripture: thus, in Gal. iv. 4. it is ſaid, "God ſent forth "his ſon, made of a woman:" and 1 John iv. 14. "And we have ſeen and "do teſtify, that the Father ſent the Son "to be the ſaviour of the world."

The generation of Chriſt was miraculous, as being conceived by the power of the Holy Ghoſt, and born of the Virgin Mary; from the time of which bleſſed nativity, the chriſtian æra commences. See the article EPOCHA.

INCARNATIVES, in ſurgery, medicines which aſſiſt nature in filling up wounds or ulcers with fleſh; or rather remove the obſtructions thereto. See VULNERARY.

Internal incarnatives are aliments which ſupply a balſamic chyle, and conſequently generate fleſh, and produce a full or plump habit.

INCARNATIVE, or UNITING BANDAGE, is a bandage of the head, ſo called from its being uſed to unite the lips of a wound. It is about two inches broad, having a longitudinal ſlit in its middle, about the length of three or four fingers breadth. See plate XXV. fig. 3. n° 6.

The chief uſe of this bandage is to retain the lips of a rectilinear wound cloſe together, whether in the head, eye-lids, or other parts of the body. For the method of applying it, roll up each end, and after the wound has been dreſſed with proper balſams, and a plaſter and two narrow compreſſes laid on each ſide, the ſlit of the bandage is to be fixed near the wound, in ſuch a manner, that one of its ends being carried round the head, and the roller being paſſed through the ſlit, both of the rollers are drawn tight, ſo as to bring the lips of the wound cloſe together. The two rollers in each hand being then exchanged, and croſſed upon the forehead, and the like being done under the chin, as long as the bandage will permit, each end of it is to be faſtened by pins or ſuture. This bandage is not to be taken off till the lips of the wound may be ſuppoſed to be united; unleſs any urgent ſymptoms ſhould require its removal.

INCARTATION, among chemiſts, the ſame with depart. See DEPART.

INCENSE, or FRANK-INCENSE, in th materia medica, *&c.* a dry reſinous ſubſtance, known among authors by th names thus and olibanum. See the articl OLIBANUM.

Incenſe is a rich perfume, with which th antient pagans, and the roman catholic ſtill, perfume their temples, altars, *&c.*

The burning of incenſe made part of th daily ſervice of the antient jewiſh church The prieſts drew lots to know wh ſhould offer it; the deſtined perſon too a large ſilver diſh, in which was a cenſe full of incenſe; and being accompanie by another prieſt, carrying ſome liv coals from the altar, went into th temple. There, in order to give notic to the people, they ſtruck upon an inſtrument of braſs placed between th temple and the altar; and being returned to the altar, he who brough the fire left it there, and went away Then the offerer of incenſe having ſai a prayer or two, waited the ſignal whic

Fig. 1. ICOSAHEDRON.

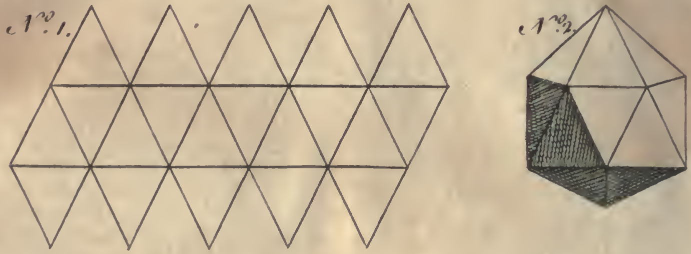


Fig. 2. INCIDENCE.

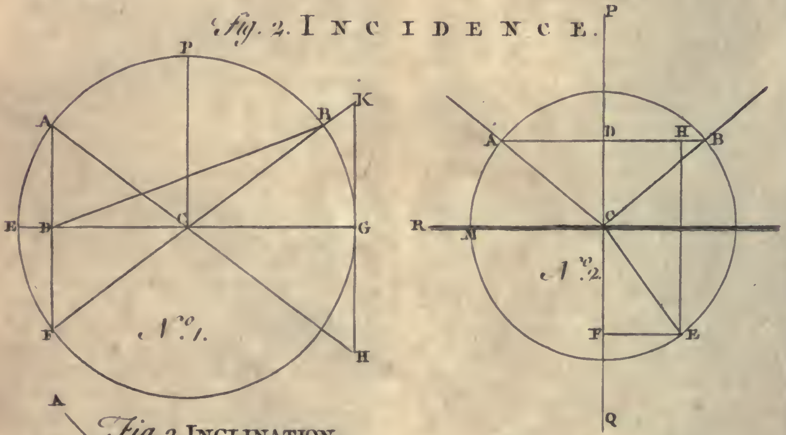


Fig. 3. INCLINATION.

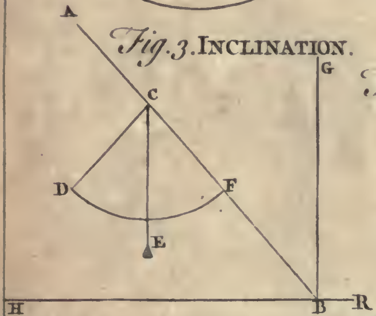


Fig. 5. IRIS, the *FLOWER DE LUCE*.

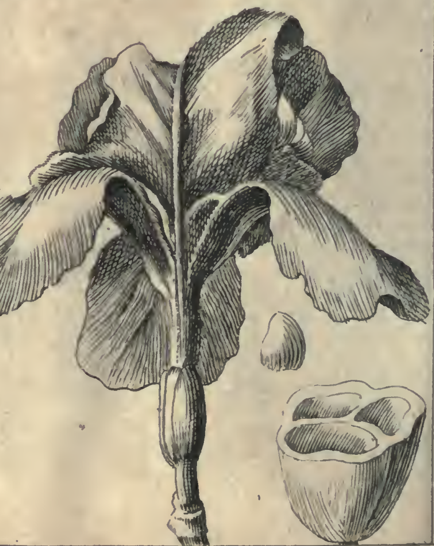
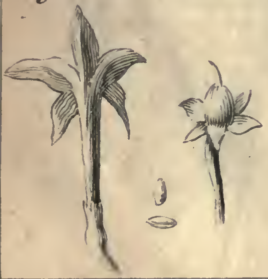


Fig. 4. IPOMÆA.



J. Jefferys sculp

which was the burning of the holocauſt; immediately upon which he ſet fire to the incenſe, the whole multitude continuing all the time in prayer. The quantity of incenſe offered each day, was half a pound in the morning, and as much at night.

One reaſon of this continual burning of incenſe might be, that the multitude of victims that were continually offered up, would have made the temple ſmell like a ſlaughter-houſe, and conſequently have inſpired the comers rather with diſguſt and averſion than awe and reverence, had it not been overpowered by the agreeable fragrance of thoſe perfumes.

INCEPTIVE, a term uſed by Dr. Wallis to expreſs ſuch moments, or firſt principles, which, though of no magnitude themſelves, are notwithſtanding capable of producing it. Thus, a point is inceptive of a line, and a line inceptive of ſurface, *&c.*

INCEST, the crime of venereal commerce between perſons who are related in a degree wherein marriage is prohibited by the law of the country.

Some are of opinion that marriage ought to be permitted between kinsfolks, to the end that the affection ſo neceſſary in marriage might be heightened by this double tie, and yet the rules of the church have formerly extended this prohibition even to the ſeventh degree; but time has now brought it down to the third or fourth degree.

Moſt nations look on inceſt with horror, Perſia and Egypt alone excepted. In the hiſtory of the antient kings of thoſe countries we meet with inſtances of the brother's marrying the ſiſter; the reaſon was, becauſe they thought it too mean to join in alliance with their own ſubjects, and ſtill more ſo to have married into any foreign family.

INCEST SPIRITUAL, a crime committed in like manner between perſons who have a ſpiritual alliance by means of baptiſm or confirmation.

Spiritual inceſt is alſo underſtood of a vicar or other beneficiary, who enjoys both the mother and the daughter, that is, holds two benefices, the one whereof depends upon the coalition of the other. Such a ſpiritual inceſt renders both the one and the other of theſe benefices vacant.

INCH, a well known meaſure of length; being the twelfth part of a foot, and equal to three barley-corns in length. See FOOT and MEASURE.

INCH OF CANDLE, or ſale by inch of candle. See the article CANDLE.

INCHASING, or ENCHASING. See the article ENCHASING.

INCIDENCE, in mechanics, denotes the direction in which one body ſtrikes on another.

In optics, the angle ACP, (pl. CXLIV. fig. 2. n° 1.) made by the ray AC, and the perpendicular PC, is called the angle of incidence; but Dr. Barrow, and ſome others, call it the angle of inclination; and by the angle of incidence underſtand its complement ECA.

Mr. Molyneux, in his Dioptrics, uſes the words inclination and incidence promiſcuouſly, and by the angle of incidence or inclination, always intends the angle ACP.

The angle PCB, is called the angle of reflection, and is always equal to the angle of incidence ACP; which is thus proved:

Every ray of light goes the ſhorteſt way that poſſibly it can: thus, if you ſuppoſe the ray AC, (*ibid.*) to fall on the plain glaſs or ſurface EG, and thence to be reflected to B, ſo that the angle ACE be equal to BCG; then will AC and CB, be the two ſhorteſt lines that can poſſibly be drawn from the points A and B, to the point of incidence C in the plane EG: for inſtance, they will be ſhorter than $AD + DB$, or any others.

For produce CB to F, and draw DF, becauſe the vertical angles ECF and BCG are equal, the arch EF is equal to BG, equal to AE by the ſuppoſition; but it is plain, that $FC = AC = CB$; wherefore FB $(= AC + CB)$ is leſs than $DF + DB = AD + DB$: and ſo it will be in every caſe. Wherefore, ſince the ray muſt go the neareſt way, the angle of incidence will always be equal to that of reflection: For the two angles ECA, and BCG, being thus equal, their compliments ACP and PCB muſt alſo be equal, and may be thus proved. Produce the ray AC directly till it meet with the perpendicular GH in H: then make GK equal GH, and produce CB to K: I ſay CK is the reflected ray, and that the angle PCK is equal to PCA: for PC being drawn perpendicular to the plane EG, the angles $ECA + ACP$ are equal to the angles $GCB + KCP$; becauſe they are both equal to a right angle. But E C A is equal to G C H, which is equal to G C K by conſtruction; and therefore the angle of incidence, A C P, is equal to the angle of reflection, P C K. Q.E.D.

It is likewiſe demonſtrated in optics, that the ſines of the angles of incidence, and refraction, are to each other reciprocally as the reſiſtances of the mediums. And Sir Iſaac Newton, in his optics, ſays, the ſine of incidence is either accurately, or very nearly in a given ratio to the ſine of refraction. And that the angles of reflection, and refraction, lie in one and the ſame plane with the angle of incidence. Whence, if that proportion be known in any inclination of the incident ray, it is known in all the inclinations, and thereby the refractions in all caſes of incidence on the ſame refracting body may be determined. Thus, if the refraction be made out of air into water, the ſine of incidence of the red light is to the ſine of its refractions as 4 to 3. If out of air into glaſs, the ſines are as 17 to 11. In light of other colours, the ſines have other proportions; but the difference is ſo little, that it need ſeldom be conſidered.

Suppoſe therefore, that R S, (*ibid.* nº 2.) repreſents the ſurface of ſtagnating water, and that C is the point of incidence in which any ray coming in the air from A in the line A C, is reflected or refracted, and I would know whither this ray ſhall go after reflection or refraction: I erect upon the ſurface of the water, from the point of incidence, the perpendicular CP, and produce it downwards to Q, and conclude from what has been ſaid, that the ray after reflection and refraction, ſhall be found ſomewhere in the plane of the angle of incidence, ACP, produced. I let fall therefore, upon the perpendicular CP, the ſine of incidence A D; and if the reflected ray be deſired, I produce A D to B, ſo that D B be equal to A D, and draw C B. For this line C B ſhall be the reflected ray, the angle of reflection BCP, and its ſine B D, being equal to the angle and ſine of incidence. But if the refracted ray be deſired, I produce A D to H, ſo that D H may be to A D as the ſine of refraction to the ſine of incidence, that is, (if the light be red) as 3 to 4; and about the center C, and in the plane A C P, with the radius CA, deſcribing a circle A B E, I draw parallel to the perpendicular C P Q, the line H E cuttin the circumference in E, and joining C E this line C E ſhall be the ſine of the refracted ray. For if E F be let fall perpendicularly on the line P Q, this lin E F ſhall be the ſine of refraction of th ray C E, the angle of refraction bein E C Q; and this ſine E F is equal to D H and conſequently in proportion to th ſine of incidence A D as 3 to 4.

INCIDENT, in law, ſomething that inſeparably belongs to another: thus, a cour baron is incident to a manor.

Incident, in poetry, denotes much th ſame with epiſode. See Episode.

INCISIVE, an appellation given to whatever cuts or divides: thus, the fore-teet are called dentes inciſivi, or cutters; an medicines of an attenuating nature, incidents, or inciſive medicines. See the articles Tooth and Attenuants.

INCLE, a kind of tape made of linen-yarn, which on importation pays for ever dozen pounds, a duty of 1 l. 5 s. $8\frac{80}{100}$ d and draws back 1 l. 1 s. $11\frac{20}{100}$ d. on exportation; for the dozen pieces in rolls containing thirty-ſix yards each, 19 s $3\frac{60}{100}$ d. and draws back 16 s. $5\frac{40}{100}$ d and for every pound weight of whitene or bleached linen-yarn, known by th name of unwrought incle, or ſhort ſpinnel, 3 d.

INCLINATION, is a word frequentl uſed by mathematicians, and ſignifies th mutual approach, tendency or leaning o two lines, or two planes towards eac other, ſo as to make an angle.

Inclination of a right line to a plane, i the acute angle, which that line make with another right line drawn in th plane through the point where the inclined line interſects it, and through the point where it is alſo cut by a perpendicular drawn from any point of the inclined plane.

Inclination of the axis of the earth, is the angle which it makes with the plane of the ecliptic; or the angle, contained between the planes of the equator and ecliptic.

Inclination of a planet, is an arch of the circle of inclination, comprehended between the ecliptic and the plane of a planet in its orbit.

The greateſt inclination of ſaturn, according to Kepler, is $2^\circ\ 32'$; of jupiter, $1^\circ\ 20'$; of mars, $1^\circ\ 50'\ 30''$; of venus, $3^\circ\ 22'$; of mercury, $6^\circ\ 54'$. According to de la Hire, the greateſt inclination of

Fig. 1. INCLINED PLANE.

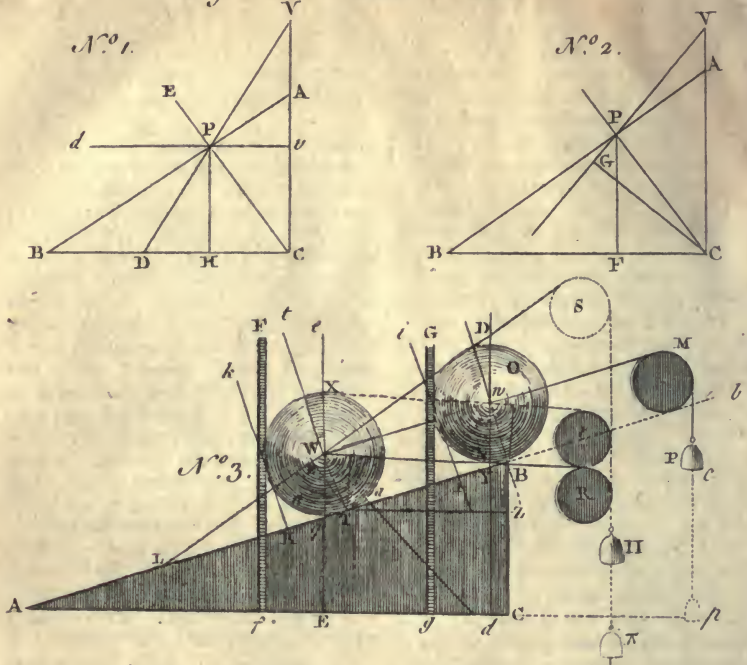


Fig. 2 INCLINED TOWER.

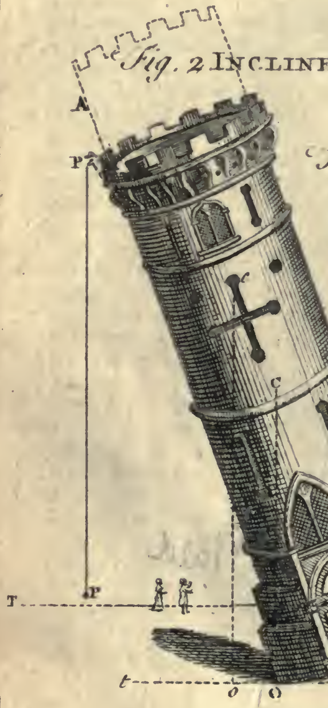


Fig. 4 INDIVISIBLES.

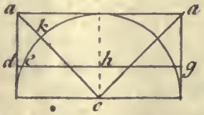


Fig. 3. INDENTED.

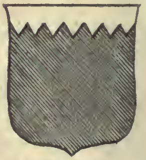
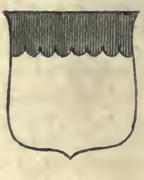


Fig. 5. INVECTED.



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ſaturn is 2° 33′ 30″; of jupiter, 1° 19′ 20″; of mars, 1° 51′ 00″; of venus, 3° 25′ 5″; of mercury, 6° 52′ 00″.

Inclination of a plane, in dialling, is the arch of a vertical circle, perpendicular both to the plane, and the horizon, and intercepted between them. To find this, Let A B (plate CXLIV. fig. 3.) be a plane inclined to the horizon H R; apply to the plane A B a quadrant D C F, ſo as the plummet C E may cut off any number of degrees on the limb as E F: I ſay the arch D E is the meaſure of the angle of inclination A B H; for draw B G perpendicular to H R, then becauſe C E is parallel to B G, the angle E C F is equal to C B G; but CDF is equal to G B H, being both right angles, therefore the angle D C F — E C F, is equal to the angle G B H — C B G; that is, D C E is equal to A B H. Q.E.D.

INCLINED PLANE, in mechanics, one that makes an oblique angle with the horizon.

If a force, with a given direction, ſupports a weight upon an inclined plane; that force is to the weight, as the ſine of the inclination of the plane to the ſine of the angle which is made by the line in which the force acts, and the line perpendicular to the plane. Thus, let A B (plate CXLV. fig. 1. n° 1.) be the inclined plane, P the weight ſupported, and D P V the direction of the force which ſupports the weight. Let P C be drawn perpendicular to A B; and from the point C, let C B be drawn parallel to the horizon, and perpendicular to the common ſection of the plane and the horizon, meeting the plane in B; and C A perpendicular to the horizon and alſo to C B, meeting the plane in A, and the line in which the force acts in V.

Now P may be conceived to be held unmoved by three forces acting together, one of which is the force of the weight itſelf tending downwards in a line parallel to V C, *viz.* P H; the ſecond is the force acting in the line D P V, and the third is the reſiſtance of the plane itſelf, acting in the line C P, perpendicular to the plane: but theſe three forces are to each other as the ſides of the triangle V P C, as will be evident by drawing a line through P parallel to V C, and completing the parallelogram H *v*. The force, therefore, is to the weight which it ſuſtains, as P V to V C; that is, as the ſine of the angle V C P, or A B C, to the ſine of the angle C P V, or C P D. Q.E.D. Therefore the force by which any heavy body would deſcend on any inclined plane, to the force of the deſcent on the perpendicular, is as the ſine of the angle of the plane's inclination to the radius. For practice therefore, let the weight of any body be W, and P the power wanted to ſuſtain it on an inclined plane. I ſay, by this theorem. R : W :: ſine incli. : P. The three firſt of which are given, wherefore the fourth is found by trigonometrical calculation, thus. Let a body weigh 9999 pounds; what power will ſuſtain it from deſcending on a plane inclined to the horizon with an angle of 34 degrees? Anſwer, 5592 pounds. See the work.

Weight 9999. 3.999957
S. ∟ incl. = 34° 9.747562
13.747519
Radius 10 000000
5592 = 3.747519 = the power.

If the points V and A coincide, that is, if the force acts according to the direction B A, the angle C P D, will be a right angle; and therefore, in that caſe, the force is to the weight as the ſine of the inclination of the plane to the radius, or as the height A C to its length A B. And in this caſe, the force which is required to ſupport a given weight is leaſt of all; becauſe the proportion of the ſine of the inclination of the plane to the radius, is leſs than its proportion to any other ſine whatever. If the point V falls above A; the greater the angle A P V is, ſo much the more force is neceſſary to ſupport the given weight upon the plane A B. Inſomuch that by increaſing the angle A P V, the proportion of the ſine of the angle A B C, to the ſine of the angle C P D, is alſo increaſed, till P V, A V, becoming parallel, and the angles V C P, C P D for that reaſon equal, the force and the weight will alſo become equal. So likewiſe if the point V falls below A, as at *v*, the force required to ſupport the given weight, is again increaſed; the angle A P *v* being increaſed, till P *v*, *v* C become equal, and then the force and the weight will become equal again. Further, when the lines P *v*, P C coincide, and the angle *v* P C by that means vaniſhes, the ſine of the angle A B C will bear an infinite proportion to the ſine of that; that is, no finite force whatſoever, acting in a line perpendicular to the plane, will be able to ſupport the weight upon the plane. If the line in in which the force acts be parallel to the baſe of the plane, the weight is to the force which ſupports it, as B C to C A, or as the baſe of the plane to the height of it. If from the point P, (*ib.* n° 2.) PF be let fall perpendicular to B C; and from the point C, C G perpendicular to V P; it will eaſily appear, that P V is to V C (that is, the force is to the weight) as C F to C G. Wherefore the force and the weight will then ſupport one another upon an inclined plane, when they are to each other reciprocally as perpendiculars drawn from the point C to the lines in which they act; (or, if G C F be looked upon as an angular balance moveable about the center C) reciprocally as the velocities of the points G and F reckoned upon the lines in which the forces act.

If it ſhould be required to liſt up a very heavy body, as W or *w* (*ibid.* n° 3.) the height C B, it would be impracticable to raiſe it up in the line C B without a power whoſe intenſity is equal to that of the weight; and even in that caſe very inconvenient to do it, eſpecially in building. But if an inclined plane A B be laid ariſing from the horizontal line A C, from whence the weight is to be raiſed, a leſs power than the weight will ſerve for that purpoſe, unleſs it puſhes the body directly againſt the plane (as in the direction W T) or draws the body away from the plane (as from W towards *e*, *t*, or L) or in any direction on that ſide of the line E *e*.

The direction in which the body can moſt eaſily be drawn or puſhed up the plane is the line W *w* M, parallel to the plane, and paſſing thro' the center of the weight; for whether the power divides a plane *k* K (in a direction perpendicular to it) along the line W M, or the power P (by its deſcent to *p*) draws it in the ſame line, the velocity of the power will be equal to the line W *w*, the ſpace deſcribed by the center of gravity of the weight, whilſt the ſame weight riſes only the perpendicular height Z B (= *n* W) or has the ſaid line properly to expreſs its velocity. If the body was a cylinder, as a rolling ſtone, and the plane T *t* were to paſs thro' the gudgeons or axis of the ſaid ſtone, it is evident that the caſe would be the ſame; and as the weight P has its rope running over the roller (or upper pulley M, the line P *p* will be the velocity of the power. Therefore in this caſe the weight (if kept in æquilibrio) will be to the power as W *w* (= T B) to *w* Y (= B Z) or as the hypothenuſe A B is to the perpendicular B C, which (by Eucl. 4. 6.) are in the ſame proportion; and conſequently, if the power be never ſo little increaſed, it will draw the weight up the plane.

That the power acts with the greateſt advantage, whilſt it draws in the line of direction W *w* (parallel to the plane) is evident, becauſe if, one end of the ſaid plane of direction remaining fixed at W the other ſhould move towards B, or beyond it, then the body would be partly drawn againſt the plane, and therefore the power muſt be increaſed in proportion to the greateſt difficulty of traction: and if the end *w* of the line abovementioned ſhould be carried to D, or beyond it, the power muſt be alſo increaſed, inaſmuch as it endeavours to liſt the body off from the plane.

If the power draws in a line of direction W B (*ibid.*) parallel to the baſe of the plane; then, in order to keep the weight W in æquilibrio by the power Π, the ſaid power muſt be to the weight, as Z B to Z T, or as the perpendicular B C to the baſe A C of the triangle A B C. For if we ſuppoſe the pulley R at ſo great a diſtance from W, that the line of direction W R may not ſenſibly alter its horizontal poſition, whilſt the body W riſes the height B Z, in ſuch manner that Πϖ (= W Y, and not W *w*) will be the velocity of the power. So that the velocity of the power to that of the weight will not be as the hypothenuſe to the perpendicular, as in the former caſe, but as the baſe to the perpendicular in the triangle A C B. If the powers be increaſed juſt enough to overcome the friction of the plane, and draw up the body W, let the pulley R be liſted up gradually to *r*, ſo as to keep the line W R parallel to itſelf till it comes to *w r*, and the power will be deſcended to *π*, when the weight is come to *w* B. But Π*π*, together with the diſtance R *r*, is equal to Π ϖ, or W Y, *&c.* And this traction, being conſtantly made in the angle W B T, is the caſe.

For the motion of the loaded cylinder upon an inclined plane, ſee CYLINDER.

INCLINED TOWERS, thoſe whoſe tops hang ſo far over, as to appear dangerous to people walking below.

Such is that repreſented in plate CXLV. fig. 2. where PP is the perpendicular let fall from the top of the tower to T T the horizontal plane. Now the reaſon why ſuch towers do not fall, is owing to their centers of gravity being ſupported: thus C, the center of gravity of the tower here repreſented, is ſupported by the perpendicular C O, ſo that it cannot fall; but had the tower been built higher to A, ſo as to transfer the center of gravity from C to *c*, the tower muſt have fallen, ſince the perpendicular *c o* is not ſupported, as falling without the foundation of the tower.

INCLINERS, or INCLINING DIALS. See the article DIAL.

INCLOSURE, in huſbandry, the fence or hedge made to incloſe lands. See the articles FENCE and HEDGE.

A very good incloſure may be made of elder-ſticks, or truncheons, cut ten or twelve feet long, and ſtuck into the bank ſlope-wiſe, ſo as to make a chequer-work. Theſe make the ſpeedieſt ſhelter of any; and when the trees are grown up, they are valuable for the turner's uſe. They ſucceed extremely well in watery places; and when planted on the banks of rivers, they prevent them from being undermined by the current.

The throwing down incloſures is an offence puniſhable by our antient ſtatutes; yet if the lord of a manor incloſes part of the waſte, and does not leave ſufficient room for the commoners, they may break down ſuch incloſure, or have a writ of aſſize.

INCOGNITO, or INCOG, is applied to a perſon that is in any place, where he would not be known: but it is more particularly applied to princes, or great men, who enter towns, or walk the ſtreets without their ordinary train, or the uſual marks of their diſtinction and quality.

INCOMBUSTIBLE, ſomething that cannot be burnt, or conſumed by fire.

Authors talk much of an incombuſtible cloth, made of the aſbeſtus. See the article ASBESTUS.

In the Philoſophical Tranſactions, n° 276, we have an account of an incombuſtible lint, which is a peculiar ſpecies of aſbeſtus, or earth-flax, which is never formed into compact maſſes as the other ſpecies are, but is always found in looſe filaments, very fit to be wrought into cloth. It is found only, ſo far as yet known, in the county of Aberdeen in Scotland.

The antient Romans ſpun their aſbeſtus into cloths, in which they wrapped up the dead bodies, before committing them to the funeral pile, in order to preſerve their aſhes diſtinct from thoſe of the wood. What they had for this purpoſe, ſeems, by all accounts, to have been very ſhort; but this ſpecies would be much more proper, as being ſeven or eight inches long.

INCOMMENSURABLE, a term in geometry, uſed where two lines, when compared to each other, have no common meaſure, how ſmall ſoever, that will exactly meaſure them both. And in general, two quantities are ſaid to be incommenſurable, when no third quantity can be found that is an aliquot part of both.

Such are the diagonal and ſide of a ſquare; for tho' each of thoſe lines have infinite aliquot parts, as the half, the third, *&c.* yet not any part of the one, be it ever ſo little, can poſſibly meaſure the other, as is demonſtrated in prop. 117. lib. x. of Euclid.

Rappus, lib. iv. prop. 17. ſpeaks alſo of incommenſurable angles. As to ſurfaces which cannot be meaſured by a common ſurface, they are ſaid to be incommenſurable in power.

INCOMMENSURABLE NUMBERS are ſuch as have no common diviſor, that will divide them both equally.

INCOMPATIBLE, that which cannot ſubſiſt with another, without deſtroying it: thus cold and heat are incompatible in the ſame ſubject, the ſtrongeſt overcoming and expelling the weakeſt.

INCORPORATION, in pharmacy, is much the ſame as impaſtation, being a reduction of dry ſubſtances to the conſiſtence of a paſte, by the admixture of ſome fluid; thus pills, boles, troches, and plaſters are made by incorporation. Another incorporation is, when things of different conſiſtences, are by digeſtion reduced to one common conſiſtence.

INCORPOREAL, a thing, or ſubſtance, which has no body; as God, angels, and the ſoul of man.

INCORRUPTIBLE, that which cannot be corrupted. See CORRUPTION.

INCORRUPTIBLES, or INCORRUPTICOLÆ, in church-hiſtory, heretics which had their original at Alexandria, in the time of the emperor Juſtinian. Their diſtinguiſhing tenet was, that the body of Jeſus Chriſt was incorruptible from his conception, by which they meant that after and from the time he was formed in the womb of his holy mother, he was not ſuſceptible of any change or alteration, not even of any natural and innocent paſſions, as hunger, thirſt, *&c.* ſo that he eat without any occaſion before his death, as well as after his reſurrection.

INCRASSATING, in pharmacy, *&c.* the rendering fluids thicker by the mixture of other ſubſtances leſs fluid; or by the evaporation of the thinner parts.

Incraſſating medicines are ſuch as reduce the too fluid blood and juices to a proper conſiſtence, and a due condenſation.

INCROACHMENT, in law, ſignifies an unjuſt gaining upon the eſtate or poſſeſſion of another, as where a perſon ſets his wall or hedge too far into the ground of his neighbour. A rent may be likewiſe ſaid to be incroached upon, where the lord, by diſtreſs or other means, compells his tenant to pay more than he owes. Sometimes this word has been applied to power and authority, as where any officer, deputed by the king, aſſumes to himſelf a greater power or juriſdiction than the law intends him.

INCRUSTATION, in ſurgery, the induction of a cruſt or eſchar upon any part.

Among maſons, incruſtation ſignifies the lining or coating of a wall, either with gloſſy ſtones, ruſtics, marble, pottery, or ſtucco-work, and that either equably or in panels and compartiments.

INCRUSTED, or INCRUSTATED COLUMN, is a column conſiſting of ſeveral pieces, or ſlips of ſome precious marble maſticated or cemented round a mould of brick, or other matter.

INCUBATION, the action of a hen, or other fowl brooding on her eggs.

INCUBUS, or NIGHT MARE, in medicine, the name of a diſeaſe which conſiſts in a ſpaſmodic contraction of the muſcles of the breaſt, uſually happening in the night, and attended with a very painful difficulty of reſpiration and great anxiety.

The moſt obvious ſymptom of this diſeaſe is a ſenſation like that of ſome great weight laid upon the breaſt: this is attended with ſo violent a cohibition of reſpiration, that the perſon becomes unable to move any part of his body, or to utter any diſtinct or articulate ſound. This whole complaint goes off as ſoon as any one limb is moved, but there is oftentimes an univerſal laſſitude of the whole body left behind it, which remains for ſome ſpace of time.

This diſeaſe attacks people in the night-time, in a ſort of middle ſtate, between ſleeping and waking; and commonly, as Willis obſerves, when the ſtomach is oppreſſed with aliment of a hard digeſtion, eſpecially if the patient lies on his back. Thoſe of a plethoric habit are moſt ſubject to it; and among them, ſuch particularly as have a great thickneſs of the blood; as alſo perſons who are ſubject to hypochondriac complaints, and to diſorders of the ſpleen.

Hence the cauſes of this diſeaſe are a ſtagnation of the blood in plethoric habits, where it is thick about the vena portæ, which nature is endeavouring to throw off by means of thoſe ſpaſmodic motions which conſtitute this diſeaſe, and very often crudities in the primæ viæ become additional cauſes, and exaſperate the complaint. Phyſicians eſteem this diſeaſe of no danger; but Junker thinks it is much to be ſuſpected, that many of thoſe people, who are found dead in their beds, periſh by it.

When this diſtemper returns ſo often as to call for the advice of a phyſician, the method is to give gentle purges, three or four times, with the digeſtive medicines: ſuch as gum ammoniacum, or the tartarum vitriolatum: on the intermediate days after this, bleeding in the foot is proper; and when this has been done, powders of nitre and cinnabar uſually complete the cure. If they fail, the common method in hypochondriac caſes is to be uſed. When there are crudities in the primæ viæ which exaſperate this diſeaſe, then, after the purges, gentle bitters and other medicines are to be given, which will reſtore the tone of the ſtomach. Gentian-root and orange-peel in infuſion, are very good for this purpoſe. When it happens wholly from a load on the ſtomach, a gentle vomit alone will perform the cure. To prevent returns of this diſeaſe, the patient ſhould eat light ſuppers, and muſt accuſtom himſelf to lie on one or the other ſide, never on the back, nor with his head very low.

Heiſter obſerves, that thoſe who have troubled dreams, or walk in their ſleep, are to be cured in the ſame manner, as proceeding from the ſame cauſes.

INCUMBENT, a clerk, or miniſter who is reſident on his benefice: he is called incumbent, becauſe he does, or at leaſt ought, to bend his whole ſtudy to diſcharge the cure of his church.

INCUMBRAVIT, or QUARE INCUMBRAVIT, in law. See QUARE.

INCURVATION *of the rays of light*, their bending out of a rectilinear or ſtraight courſe, occaſioned by refraction. See the article REFRACTION.

INCUS, in anatomy, a bone of the internal ear, ſomewhat reſembling one of the anterior dentes molares.

In the incus, we are chiefly to obſerve its body, its fovea, or hollow, ſerving for its articulation with the malleus, and its two crura, or legs; to the longer of which, there is joined another bone called the ſtapes. See EAR.

INDEFEISIBLE, or INDEFEAZABLE, a term in law, for what cannot be defeated or made void; as an indefeiſible eſtate of inheritance, *&c.*

INDEFINITE, or INDETERMINATE, that which has no certain bounds; or to which the human mind cannot affix any. Deſcartes makes uſe of this word in his philoſophy inſtead of infinite, both in numbers and quantities, to ſignify an unconceivable number, or a number ſo great that an unit cannot be added to it; and a quantity ſo great as not to be capable of any addition. Thus, he ſays, the ſtars viſible and inviſible are in number indefinite; and not as the antients held infinite; and that quantity may be divided into an indefinite number of parts, not an infinite number.

INDEFINITE is alſo uſed in the ſchools to ſignify a thing that has but one extreme; for inſtance, a line drawn from any point and extended infinitely. Thus what they call eternity *a parte ante*, and eternity *a parte poſt*, are indefinite durations.

INDEFINITE PROPOSITION. See the article PROPOSITION.

INDEFINITE, in grammar, is underſtood of nouns, pronouns, verbs, participles, articles, *&c.* which are left in an uncertain indeterminate ſenſe, and not fixed to any particular time, thing, or other circumſtance.

INDELIBLE, ſomething that cannot be cancelled, or effaced. Thus baptiſm and ordination, according to the church of Rome, are ſacraments which convey indelible characters to the perſons baptiſed and ordained.

INDEMNITY, in law, the ſaving harmleſs; or, a writing to ſecure one from all damage and danger that may enſue from any act. An indemnity in regard to eſtates, is called a warranty. See the article WARRANTY.

Act of INDEMNITY, the ſame with act of grace. See *Act of* GRACE.

INDENTED, in heraldry, is when the out line of an ordinary is notched like the teeth of a ſaw. See plate CXLV. fig. 3.

INDENTED LINE, in fortification, the ſame with what the french engineers call redent; being a trench and parapet running out and in, like the teeth of a ſaw; and is much uſed in irregular fortification. See the article FORTIFICATION.

INDENTED LEAF, among botaniſts, is one notched round its verge. See SERRATED.

INDENTURE, in law, a deed or writing, wherein is contained ſome article, covenant, contract, or conveyance made between two or more perſons; and which is indented or tallied at the top thereof, anſwerable to another part of the ſame deed, *&c.* and having the ſame contents. It differs from a deed-poll, in that this laſt is a ſingle deed, and unindented. See DEED.

INDEPENDENTS, a ſect of proteſtants in England and Holland, ſo called from their independency on other churches, and their maintaining that each church or congregation has ſufficient power to act and perform every thing relating to religious government within itſelf, and is no way ſubject or accountable to other churches or their deputies.

They therefore diſallow parochial and provincial ſubordination, and form all their congregations upon a ſcheme of co-ordinancy. But tho' they do not think it neceſſary to aſſemble ſynods; yet if any be held, they look on their reſolutions, as prudential councils; but not as deciſions, to which they are obliged to conform.

As to their ſervice, they pray publicly for kings, and all in authority: they read and expound the ſcriptures, and adminiſter the ſacraments of baptiſm and the Lord's Supper. Their public officers are paſtors, teachers, ruling elders, and deacons. Their church cenſures lie all within the compaſs of admonition and excommunication.

The preſent independents differ from the preſbyterians only in their church government, in being generally more attached to the doctrines diſtinguiſhed by the term orthodoxy, ſuch as original ſin, election, reprobation, *&c.* and in adminiſtring the Lord's Supper at the cloſe of the afternoon's ſervice. See PRESBYTERIANS.

The ſeveral ſects of baptiſts are all independents with reſpect to church government; and, like them, adminiſter the Lord's Supper in the evening, whereas the preſbyterians adminiſter it after the forenoon's ſervice. See ANABAPTISTS.

INDETERMINATE, in general, an appellapellation given to whatever is not certain, fixed, and limited; in which ſenſe, it is the ſame with indefinite.

Indeterminate problem, in algebra, one which is capable of an indefinite number of ſolutions. See Equation.

INDEX, in anatomy, the ſame with the fore-finger. See Fingers.

Index, in arithmetic and algebra, ſhews to what power any quantity is involved, and is otherwiſe called exponent. See the article Exponent.

Index *of a logarithm*, that which ſhews of how many places the abſolute number, belonging to a logarithm, doth conſiſt; and of what nature it is, whether an integer or fraction. Thus, in this logarithm 2.523421, the number 2 ſtanding on the left hand of the point is called the index; becauſe it ſhews that the abſolute number, anſwering to the above logarithm, conſiſts of three places: for the number is always one more than the index.

If the abſolute number be a fraction, then the index of the logarithm hath a negative ſign, marked thus $\bar{2}.523421$. See the article Logarithm.

Index *of a globe*, the little ſtyle or gnomon, which being fixed on the pole of the globe, and turning round with it, points out the hours upon the hour circle. See the article Globe.

Expurgatory **Index**, a catalogue of prohibited books in the church of Rome.

The firſt catalogues of this kind were made by the inquiſitors, and theſe were afterwards approved of by the council of Trent, after ſome alteration was made in them by way of retrenchment, or addition. Thus an index of heretical books being formed, it was confirmed by a bull of Clement VIII. in 1595, and printed with ſeveral introductory rules; by the fourth of which, the uſe of the ſcriptures in the vulgar tongue is forbidden to all perſons, without a particular licence; and by the tenth rule it is ordained, that no book ſhall be printed at Rome, without the approbation of the pope's vicar, or ſome perſon delegated by the pope; nor in any other place, unleſs allowed by the biſhop of the dioceſe, or ſome perſon deputed by him, or by the inquiſitor of heretical pravity.

The Trent index being thus publiſhed, Philip II. of Spain ordered another to be printed at Antwerp, in 1571, with conſiderable enlargements. Another index was publiſhed in Spain, in 1584, a copy of which was ſnatched out of the fire when the Engliſh plundered Cadiz. Afterwards there were ſeveral expurgatory indexes, printed at Rome and Naples, and particularly in Spain.

INDIA proper, or hither india, a large peninſula in Aſia, bounded on the north by Uſbec Tartary, and Thibet; on the eaſt, by another part of Thibet, the kingdom of Aſem, Ava, and Pegu; on the ſouth by the bay of Bengal, and the Indian ocean; and by the ſame ocean and Perſia on the weſt: ſituated between 66° and 92° of eaſt longitude, and between 7° and 40° of north latitude; being about 2000 miles in length from north to ſouth, and 1500 miles in breadth from eaſt to weſt, where broadeſt; tho' the ſouthern part of the peninſula is not 300 miles broad. All the country within theſe limits is either ſubject or tributary to the great Mogul. It is frequently called Indoſtan, a name ſuppoſed to be derived from the river Indus, on its weſtern frontiers: it is alſo called the Moguiſtan, from the imperial family now upon the throne, who trace their pedigree from Tamerlane, a Mogol Tartar.

The produce of this country, and what the Europeans import from thence, is chiefly chints, callicoes, muſlins, ſome ſilk, pepper, and diamonds, which are purchaſed by moſt nations with ſilver; but the Dutch frequently barter ſpices for them, which makes the India trade doubly advantageous to them.

India beyond the Ganges, is a country bounded by Thibet and Boutan on th north; by China, Tonquin, and Cochin-China on the eaſt; by the Indian Ocea on the ſouth; and by the hither India the bay of Bengal, and the Straits o Malacca on the weſt: it is ſituated between 92 and 104° of eaſt longitude, an between the equator and 30° degrees o north latitude: being near 2000 mile in length from north to ſouth; but of very unequal breadth; in which limit are comprehended the kingdoms of Aſem Ava, Pegu, Laos, Siam, Cambodia an Malacca, governed by as many india princes; only the Dutch have uſurpe the dominion of Malacca. In th country there are a vaſt number of elephants, and conſequently a great deal o ivory; our merchants alſo meet wi gold and precious ſtones, canes, opium and ſuch other articles as are uſuall found within the tropics.

INDIA leaf, the leaf of a large ar

lofty tree, called malabathrum, which grows in Malabar, principally upon the mountains.

The antients have ſaid much of the virtues of the malabathrum; they call it ſtomachic, ſudorific and cephalic. Dioſcorides aſcribes to it all the virtues of the indian ſpikenard, and ſays, that it poſſeſſes them in a ſuperior degree: but at preſent it is utterly diſregarded, and only kept in the ſhops as an ingredient in the theriaca, mithridate, and ſome other compoſitions.

NDICATION, in phyſic, whatever ſerves to direct the phyſician how to act.

There are four ſorts of indications, 1. The prophylactive or preſervative, which directs what is neceſſary to be done, in order to preſerve health, and avert threatned diſeaſes. 2. Curative, ſhewing how to remove diſeaſes actually formed. 3. Palliative, or mitigatory, which relates to the mitigation of the ſymptoms, when too violent to be neglected till the termination of the diſeaſe. 4. Vital, which relates to the immediate preſervation of life.

NDICATIVE, in grammar, the firſt mood, or manner, of conjugating a verb, by which we ſimply affirm, deny, or aſk ſomething; as, *amant*, they love; *non amant*, they do not love; *amantne*, do they love?

NDICATIVE COLUMN. See COLUMN.

NDICAVIT, in law, a writ or prohibition that lies for a patron of a church, whoſe clerk is ſued in a ſpiritual court by another clerk for tythes, amounting to the fourth part of the profits of an advowſon; for then the ſuit belongs to the king's court.

This writ cannot be had before the defendant is libelled in the eccleſiaſtical court, a copy of which muſt be produced in the court of chancery, before the writ is granted; and brought before judgment is given in the ſpiritual court, otherwiſe the indicative will be void.

NDICTION, in chronology, a cycle of fifteen years. See CYCLE.

The roman or papal indiction, which is that uſed in the pope's bulls, begins on the firſt of January; and by it the popes have dated their acts ever ſince Charlemain made them ſovereigns. But beſides this, there are other two kinds of indiction mentioned by authors, *viz.* that of Conſtantinople, beginning on the firſt of September; and the imperial or cæſarian indiction, which commenced on the 14th of September.

INDICTION is alſo uſed for the convoking an eccleſiaſtical council or aſſembly. See the article COUNCIL.

INDICTIVE FEAST DAYS, *indictivæ feriæ*, the ſame with thoſe called conceptive. See the article FERIÆ.

INDICTMENT, in law, is a bill or declaration of complaint, at the ſuit of the king, drawn up in form of law, and exhibited againſt a perſon, and afterwards preferred to the grand jury or inqueſt, who are to find whether the complaint be true or not. An indictment differs from an accuſation only in this, that the preferrer of the bill is not tied to the proof thereof, under any penalty, except there appear to be a conſpiracy.

As indictments are purely for the good and quiet of the common-wealth, they are to be preferred for criminal, not civil matters. They are uſed in caſes of high treaſon, and petit treaſon, felony, and treſpaſſes of all kinds, and in all pleas of the crown; though they cannot be uſed for injuries of a private nature, that neither concern the king nor the public: and therefore all indictments ought to be brought for offences committed againſt the common-law, or againſt ſtatutes; and not for every ſlight miſdemeanor. A perſon cannot be indicted of ſuſpicion of felony, but of the very crime itſelf; and then if he be not in cuſtody, the ſheriff is commanded to attach his body by a capias, &c. A perſon indicted for felony may have counſel allowed to ſpeak for him, as to matter of law only: but ſuch as are indicted for treaſon may have a copy of their indictment before trial, in order to adviſe with counſel; and ſuch indictments are to be found within three years after the offence committed, unleſs the treaſon be directly againſt the king's perſon.

Indictments muſt be certain in every point, and charge ſome particular offence; alſo goods ſtolen muſt be particularly ſet down, and the offence laid poſitively, and not by way of recital. There muſt alſo be expreſſed the chriſtian name, ſurname, and addition of the offender, with the day, year, and place in which the offence was committed, as alſo the nature of the offence. In an indictment for murder, the length, depth, or other dimenſion of the wound muſt be expreſſed, that a judgment may be formed whether it was mortal: and in felony, the value of the things ſtolen is to be particularly mentioned, in order that it may appear whether the offender has been guilty of grand or petit larceny. A miſtake in ſpelling the defendant's ſurname is not a ſufficient cauſe for abating the indictment, provided it ſounds like it. If a word of conſequence be omitted in an indictment, it renders the whole naught; but the caſe is not the ſame, where a word of form is omitted, or where there is an omiſſion of a ſynonymous word, if the ſenſe is not injured. In caſe one part of an indictment is inconſiſtent with another part of it, the indictment becomes void; tho' where the ſenſe is plain, the court will diſpenſe with a ſmall inconſiſtency. Indictments are amendable the ſame term they are brought into court, but not afterwards; and in criminal proſecutions, the amendment muſt be only ſuch as is permitted by the common law. Indictments for crimes committed, ought to be laid in the county where they were done; for otherwiſe, upon pleading the general iſſue, not guilty, if it appears that the offence was committed in another county or place different from that in the indictment, the defendant will be acquitted. An offender is ſubject to indictment, for a felony committed againſt a perſon unknown; yet ſome body muſt be proved to be the proprietor upon the trial, or elſe the property will be preſumed to be in the priſoner, he having pleaded not guilty. An indictment being at the king's ſuit, the proſecutor is a good witneſs to prove the charge contained in it; and no damage can be given to the party aggrieved, except it be particularly grounded on ſome ſtatute. Indictments before juſtices of the peace may be removed by certiorari into the king's bench.

INDIES, eaſt and weſt. See INDIA and AMERICA.

INDIGESTION, in medicine, a crudity, or want of due coction, either in the food, an humour of the body, or an excrement. See CRUDITY and DIGESTION.

INDIGETES, a name which the antients gave to ſome of their gods.

There are various opinions about the ſignification of this word; ſome maintaining it was given to all the gods, in general; and others only to the ſemi-gods, or great men deified. Others ſay, it was given to ſuch gods as were originally of the country, or rather ſuch as were the gods of the country that bor this name. Others again, hold, that i was aſcribed to ſuch gods as were patron and protectors of particular cities.

INDIGNATORIUS MUSCULUS, a muſcl of the eye, otherwiſe called abducens and rectus exterior: it has this appellation from its drawing the eye outwards thereby occaſioning the appearance c ſcorn. See the article EYE.

INDIGO, in commerce, a preparation c the juice of a plant, called by ſome ani the characters of which are theſe: th cup is plane; the alæ of the flower ar connivent at their upper edges, and ar of the ſame figure with the vexillum. I is one of the diadelphia-decandria cla of Linnæus.

This plant grows to about two feet high with roundiſh leaves: and is a native c both the Eaſt and Weſt-Indies.

As to the indigo blue, it is a fecula, c ſettling, made by means of water an oil olive out of the leaves of the anil, c indigo plant: there is a difference be tween that made by the leaves only, an that which is made of the leaves an ſmall branches. The choiceſt of th former ſort is that which bears the ſur name of Serquiſſe, from a village of tha name ſome leagues from Surat in th Eaſt-Indies. It is made alſo about Bian and Coſſa near Agra; and alſo in th kingdom of Golconda. In making th feculæ of anil, in order to make indig of it, they cut the herb with a ſickle when the leaves begin to fall upon touching them; and after they have ſtrippe them from the branches, they put ther into a ſufficient quantity of water in veſſel called the ſteeping vat; and le them infuſe there thirty or thirty-fiv hours; after which they turn the cock in order to let the water run off, whic is become of a green colour inclining towards blue, into a veſſel of the natur of a churn, where it is worked by mean of a roller or turner of wood, the end of which are pointed and faced wit iron: this they work till the wate abounds with a lather; then they ca into it a little oil of olive, that is, on pound into ſuch a quantity of the liquor as will yield ſeventy pounds of indigo ſuch as is ſaleable; and as ſoon as th ſaid oil is thrown in, the lather ſeparate into two parts, ſo that you may obſerve a quantity curdled as milk is whe ready to break: then they ceaſe working, and let it ſtand to ſettle; which when it has done ſome time, they open the pipe or cock of the veſſel, in order to let the water clear off, that the feculæ which is ſubſided may remain behind at the bottom of the veſſel like the lees of wine. Then taking it out, they put it into ſtraining bags of cloth, to ſeparate what water was left: after which they convey it into cheſts or boxes that are ſhallow, to dry it; and being dried, it is what we call indigo.

Chooſe the indigo of Serquiſſe in flat cakes, of a moderate thickneſs, neither too ſoft nor too hard, of a deep violet colour, light, and ſuch as ſwims on water; and when broken, has no white ſpots in it; and, laſtly, ſuch as is copperiſh or reddiſh on being rubbed with one's nail, and has the leaſt duſt and broken pieces in it.

The other ſort of indigo is alſo the feculæ made from the anil, and differs nothing from the former, but as it is made of the whole plant, ſtalk and leaf; the beſt of which kind is that which bears the name Guatimala, that comes from the Weſt Indies. In chooſing this indigo, it ſhould be as near the other kind as can be; but the ſureſt proof of its goodneſs is its burning upon the fire like wax, and leaving only a little aſhes behind. The ſecond ſort of indigo is that of St. Domingo, differing nothing from the Guatimala, only that it is not of ſo lively a colour; the third is the Jamaica indigo; the fourth is that of the Leeward iſlands; all which are better or worſe, according as they are more or leſs neat and pure.

The uſe of the indigo is for the dyer and landreſſes, ſerving the laſt to put among their linen. The painters uſe it to grind with white for painting in blue; for if it is uſed alone and neat, it turns black; ground with yellow, it makes a green: ſome confectioners and apothecaries prepoſterouſly uſe this to colour ſugars, with which to make conſerves and ſyrup of violets, by adding ſome orrice.

From and after the 25th of March 1749, all perſons who ſhall import into Great Britain, from any of the britiſh colonies in America, in veſſels trading and manned as by law directed, any good and merchantable indigo, free from any falſe mixtures and fit for dyers uſe, being the product of the colony from whence the ſame was imported, ſhall be intitled to ſix-pence for every pound thereof, to be paid out of the cuſtoms upon demand by the collector of the port where the ſame is imported. If any perſon make entry of foreign made indigo under the name of britiſh plantation made, or ſhall mix any foreign indigo or any falſe mixture with that made in the britiſh plantations, in order to claim the premium, he ſhall forfeit the ſaid indigo; and in caſe of ſuch mixture, the quantity ſo mixed, both foreign and britiſh plantation made, and double the value thereof, ſhall be forfeited by the perſon making ſuch mixture.

Indigo of Turky, of the Weſt Indies, or rich indigo, as alſo duſt indigo, and that of the britiſh plantations, pay no duty on importation, and conſequently have no draw-back on exportation.

INDIGOFERA, *indigo*, in botany. See the laſt article.

INDIRECT *modes of ſyllogiſms*, in logic, are the five modes of the fourth figure, expreſſed by the barbarous words *baralip, celantes, dabitis, ſapeſmo, friſeſom*. See MODE and FIGURE.

It is the converſion of the concluſion which renders the modes indirect; for inſtance, a ſyllogiſm in *darii*, and another in *dabitis*, would be perfectly alike were it not for that converſion; the propoſitions having the ſame quantity and the ſame quality, and the middle term being the ſubject in the major and the attribute in the minor, in both; it remains then that to make a diſtinction, that which is the ſubject of the concluſion in *darii*, be the attribute in the concluſion of *dabitis*; and that which is the attribute in the firſt, the ſubject in the laſt.

DA- Every thing that promotes ſalvation is advantageous:
RI- There are afflictions which promote ſalvation:
I. Therefore, there are afflictions which are advantageous.
DA- Every thing that promotes ſalvation is advantageous:
BI- There are afflictions which promote ſalvation:
TIS. Therefore, ſome things promoting ſalvation are afflictions.

INDIVIDUAL, *individuum*, in logic, a particular being of any ſpecies, or that which cannot be divided into two or more beings equal or alike.

The uſual diviſion in logic is made into genera or genus's, thoſe genera into ſpecies, and theſe ſpecies into individuals.

See the articles GENUS and SPECIES. The ſchoolmen make a four-fold diſtinction of individuals, *viz.*

Individuum vagum, that which, tho' it ſignifies but one thing, yet may be any of that kind: as when we ſay a man, a certain perſon, or one ſaid ſo and ſo; tho' but one perſon is meant, yet that one perſon, for aught that appears to the contrary, may be any body.

Individuum determinatum, is when the thing is named and determined, as Plato, Socrates, mount Atlas: this is alſo called individuum ſignatum.

Individuum demonſtrativum, is when ſome demonſtrative pronoun is uſed in the expreſſion, as this man, that woman.

Individuum ex hypotheſi, or by ſuppoſition, is when an univerſal name or term is reſtrained by the ſuppoſition to a particular thing; as when we ſay the ſon of Mary, inſtead of Chriſt; the writer of the trojan war, inſtead of Homer.

INDIVISIBLE, among metaphyſicians. A thing is ſaid to be indiviſible abſolutè, abſolutely indiviſible, that is a ſimple being, and conſiſts of no parts into which it may be divided. Thus God is indiviſible in all reſpects, as is alſo the human mind, not having extenſion or other properties of body.

INDIVISIBLE *ſecundum quid eſt*, indiviſible with reſpect to what it now is, a ſubſtance which, though it conſiſts of parts into which it may be divided, yet never can be ſo divided as to remain the ſame: thus a meaſure or number is ſaid to be indiviſible, for if from a foot-line, for example, any thing is deducted, it is no more a foot-line; and if from the number three any thing is ſubtracted, it is no longer the ſame number. See the next article.

INDIVISIBLES, in geometry, the elements or principles into which any body or figure may be ultimately reſolved; which elements are ſuppoſed infinitely ſmall: thus a line may be ſaid to conſiſt of points, a ſurface of parallel lines, and a ſolid of parallel and ſimilar ſurfaces; and then, becauſe each of theſe elements is ſuppoſed indiviſible, if in any figure a line be drawn through the elements perpendicularly, the number of points in that line will be the ſame as the number of the elements; whence we may ſee that a parallelogram, priſm, or cylinder, is reſolvable into elements or indiviſibles, all equal to each other, parallel and like to the baſe; a triangle into lines parallel to the baſe, but decreaſing in arithmetica proportion, and ſo are the circles which conſtitute the parabolic conoid, and thoſe which conſtitute, the plane of a circle, or ſurface of an iſoſceles-cone. See the article INFINITESIMALS.

A cylinder may be reſolved into cylindrical curve ſurfaces, having all the ſame height, and continually decreaſing inwards, as the circles of the baſe do on which they inſiſt.

The method of indiviſibles is only the antient method of exhauſtions, a littl diſguiſed and contracted. It is found o great uſe in ſhortening mathematical demonſtrations, of which take the following inſtance in the famous propoſition o Archimedes, *viz.* that a ſphere is tw thirds of a cylinder circumſcribing it.

Suppoſe a cylinder, an hemiſphere, an an inverted cone, (plate CXLV. fig. 4. to have the ſame baſe and altitude, an to be cut by infinite planes all paralle to the baſe, of which *dg* is one. It i plain the ſquare of *dh* will be every wher equal to the ſquare of *kc* (the radius o the ſphere) the ſquare $bc = eb$ ſquare and conſequently, ſince circles are to on another as the ſquares of the radii, al the circles of the hemiſphere will be equa to all thoſe of the cylinder, deducting thence all thoſe of the cone: wherefor the cylinder, deducting the cone, is equa to the hemiſphere: but it is known, tha the cone is one third of the cylinder, an conſequently the ſphere muſt be tw thirds of it. Q. E. D.

INDORSEMENT, in law, any thing written on the back of a deed, as a receipt for money received.

There is likewiſe an indorſement, b way of aſſignment, on bills of exchang and notes of hand; which is done, b writing a perſon's name on the bac thereof. See the article BILL.

INDRAPORE, a dutch ſettlement on th weſt coaſt of Sumatra, in the Eaſt Indies.

INDUCEMENT, in law, ſignifies wha may be alledged as a motive; and, i our law, it is uſed ſpecially in ſevera caſes; as, there is an inducement to actions, to a traverſe in pleading, and t an offence committed, &c. It has bee held that a general indebitus is inſufficient, where it is the ground of an action; but where it is only the inducement to it, as in conſideration of forbearing a debt till a certain day, thi being a collateral promiſe, is good with-

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out ſhewing how the debt became due. A perſon ought to induce his traverſe, when he denies the title of another; for this reaſon, becauſe he ſhould not deny it, till he ſhews ſome colourable title in himſelf; and becauſe, if the title traverſed ſhould be found naught, and no colour appear for him who traverſed, in that caſe no judgment can be given.

INDUCTION, in law, is putting a clerk or clergyman in poſſeſſion of a benefice or living to which he is collated, or preſented. See PRESENTATION.

After the biſhop has granted inſtitution, which is a kind of approbation of the choice made of the perſon, he iſſues out his mandate to the archdeacon to induct him; who either does it perſonally, or commiſſions ſome other perſon to do it for him. This is analogous to livery and ſeiſin in temporal eſtates, and puts the clergyman inducted into poſſeſſion of the church, glebe-land, tythes, *&c.*

Induction is performed in the following manner: the clergyman commiſſioned takes the miniſter to be inducted by the hand, lays it upon the key of the church the ring of the door, the latch of the church-gate, or on the church-wall, and pronounces theſe words, "By virtue of this commiſſion, I induct you into the real and actual poſſeſſion of the rectory of, *&c.* with all its appurtenances." Then he opens the church door, and puts the parſon in poſſeſſion, who commonly tolls a bell, to give notice to the people that he has taken poſſeſſion of the church.

Induction may alſo be made by delivery of a clod or turf of the glebe.

INDUCTION, in logic, a conſequence drawn from principles firſt laid down. See the article CONSEQUENCE.

Thus the concluſion of a ſyllogiſm, is an induction made from the premiſes, See SYLLOGISM, CONCLUSION, *&c.*

Induction is alſo uſed for a kind of ſyllogiſm itſelf, being a medium between an enthymeme and a gradation, in regard it wants a propoſition (which however is underſtood) as in the enthymême, and abounds in aſſumptions (which yet are collateral, or of the ſame degree) which is the caſe in a gradation. See the articles ENTHYMEME and GRADATION.

There are reckoned three kinds of Induction, 1. That which concludes ſome general propoſition from an enumeration of all the particulars of a kind, which is called dialectic induction. In this way of reaſoning, if one part of the enumeration be wanting, it deſtroys the whole. The ſecond kind proceeds by interrogation, and concludes with a probability: This is called παραγωγὴ, and was what Socrates ordinarily made uſe of. The third kind of induction is properly rhetorical, being a concluſion drawn from ſome example or authority.

For a full account of that ſpecies of reaſoning called induction, ſee the article REASONING.

INDULGENCES, in the romiſh church, are a remiſſion of the puniſhment due to ſins, granted by the church, and ſuppoſed to ſave the ſinner from purgatory. Clement VI. in his decretal, which is generally received by the church of Rome, declares, that our Saviour has left an infinite treaſure of merits, ariſing from his own ſufferings, beſides thoſe of the bleſſed virgin and the ſaints; and that the paſtors and guides of the church, and more eſpecially the popes, who are the ſovereign diſpoſers of this treaſure, have authority to apply it to the living, by virtue of the keys, and to the dead, by way of ſuffrage, to diſcharge them from their reſpective proportions of puniſhment, by taking juſt ſo much merit out of this general treaſure, as they conceive the debt requires, and offering it to God.

The power of granting indulgences has been greatly abuſed in the church of Rome. It was one of the chief things which the council of Conſtance laid to the charge of John XXIII. in 1415, that he impowered his legates to abſolve penitents from all ſorts of crimes, upon the payment of ſums proportionable to their guilt. Pope Leo X. in order to carry on the magnificent ſtructure of St. Peter's at Rome, publiſhed indulgences, and a plenary remiſſion to all ſuch as ſhould contribute money towards it. Finding the project take, he gave his ſiſter, the princeſs of Cibo, the benefit of the indulgencies of Saxony, and the neighbouring parts, and farmed out thoſe of other countries to the higheſt bidders, who, to make the beſt of their bargains, procured the ableſt preachers to cry up the value of the ware. "Happy times for ſinners! ſays a modern writer, their crimes were rated, and the remiſſion of them ſet up by auction. The apoſtolic chancery taxed ſins at a pretty reaſonable rate. It coſt but ninety livres, and a few ducats,

“ for crimes which people on this ſide
“ the Alps puniſhed with death.”

It was this great abuſe of indulgences that contributed not a little to the firſt reformation of religion in Germany, where Martin Luther began firſt to declaim againſt the preachers of indulgences, and afterwards againſt indulgences themſelves: but ſince that time the popes have been more ſparing in the exerciſe of this power: however, they ſtill carry on a great trade with them to the Indies, where they are purchaſed at two reals a piece, and ſometimes more.

The pope likewiſe grants indulgences to perſons at the point of death, that is, he grants them, by a brief, power to chooſe what confeſſor they pleaſe, who is authorized thereby to abſolve them from all their ſins in general.

INDULT, in the church of Rome, the power of preſenting to benefices granted to certain perſons by the pope. Of this kind is the indult of kings and ſovereign princes, in the romiſh communion, and that of the parliament of Paris granted by ſeveral popes. By the concordat for the abolition of the pragmatic ſanction, made between Francis I. and Leo X. in 1516, the french king has the power of nominating to biſhoprics, and other conſiſtorial benefices, within his realm. At the ſame time, by a particular bull, the pope granted him the privilege of nominating to the churches of Britany and Provence. In 1648, pope Alexander VIII. and in 1668, Clement IX. granted the king an indult for the biſhoprics of Metz, Toul, and Verdun, which had been yielded to him by the treaty of Munſter; and in 1668, the ſame pope Clement IX. granted him an indult for the benefices in the counties of Rouſillon, Artois, and the Netherlands. The cardinals likewiſe have an indult granted them by agreement between pope Paul IV. and the ſacred college in 1555, which is always confirmed by the popes at the time of their election. By this treaty the cardinals have the free diſpoſal of all the benefices depending on them, and are impowered likewiſe to beſtow a benefice in commendam.

INDULTO, a duty, tax, or cuſtom paid to the king of Spain, for all ſuch commodities as are imported from the Weſt-Indies in the gallions. See GALLION.

INDUS, a large river of Aſia, which riſes in the mountains which ſeparate Tartary from India, and diſcharges itſelf into the Indian ocean.

INERTIA *of matter*, in philoſophy, is defined by Sir Iſaac Newton to be a paſſive principle by which bodies perſiſt in their motion or reſt, receive motion in proportion to the force impreſſing it, and reſiſt as much as they are reſiſted. It is alſo defined by the ſame author to be a power implanted in all matter, whereby it reſiſts any change endeavoured to be made in its ſtate.

This power then coincides with the vis reſiſtendi, or power of reſiſting, whereby every body endeavours, as much as it can, to perſevere in its own ſtate, whether of reſt or uniform rectilinear motion; which power is ſtill proportionable to the quantity of matter in any body: for ſince natural bodies conſiſt of a maſs of matter, that, of itſelf is not able to induce any change in its ſtate, if bodies were once at reſt, it is neceſſary that they ſhould always remain in that ſtate of reſt, unleſs there is applied a new force to produce motion in them: but if they were in motion, the ſame energy of force would always preſerve the motion; and therefore bodies would always retain their motion, and would always proceed forward in the ſame right line with the ſame tenour, ſince they cannot of themſelves acquire either reſt or a retardation, or a change of their direction to turn on one ſide or the other.

There are ſome philoſophers who readily enough acknowledge, that no body can move of itſelf, that is, paſs from reſt to motion of itſelf; but then they are not as willing to grant, that bodies once moved cannot of themſelves arrive at reſt, by reaſon they ſee the motions of projectiles languiſh by degrees, and at laſt the moving bodies themſelves come to reſt. See PROJECTILES.

But as no mode or accident can of its own accord, or by itſelf, be deſtroyed, and as all effects produced by tranſient cauſes do remain always, unleſs there be ſome new and extraneous cauſe that deſtroys them; ſo likewiſe motion once commenced, will be continued always, unleſs it be hindered by ſome external cauſe: nor is it more in the power of a body once moved, to lay aſide its motion or energy to move, and return of itſelf to reſt, than it can put off the figure that it has been once formed into, and acquire a new one, without ſome extrinſic cauſe. Therefore, as there is in all bodies a certain force, or rather inactivity, whereby they oppoſe every change; from which cauſe it proceeds, that they are very difficultly put out of their ſtate, whatever it is: but that inactivity is the ſame in moving bodies as thoſe at reſt, nor do bodies leſs reſiſt the action, whereby they are brought from motion to reſt, than that whereby they paſs from reſt to motion; that is, there is not required a leſs force to put a ſtop to the motion of any body, than was before neceſſary to impreſs that motion on the ſame body. Whence ſince the vis inertiæ, or inactivity of matter, always equally reſiſts equal changes, it will not be leſs powerful to continue a body in motion, which has begun to move, than to preſerve a quieſcent body in the ſame ſtate of reſt.

There are ſome philoſophers who ſuppoſe body of its own nature to be as indifferent to motion as to reſt; but by this indifference they do not, we ſuppoſe, mean ſuch a diſpoſition in bodies, whereby they do not in the leaſt reſiſt reſt or motion: for on this ſuppoſition it would follow, that any body, however great, and moved with the ſwifteſt velocity, might be ſtopped by any the ſmalleſt force; or if the great body was at reſt, it might by moved by any body, however ſmall, without the leaſt loſs of velocity in the impelling body: that is, any ſmall body impinging on a greater one, would carry that greater body along with it, without the leaſt loſs of its motion; and each body after the impulſe, would be jointly carried along with that celerity that the ſmall body had at firſt, which we all know is abſurd. This indifference, therefore, is not placed in a non-reſiſtance to motion from a ſtate of reſt, or to reſt from a ſtate of motion; but in this only, that a body of its own nature is not more propenſe to motion than to reſt, nor more reſiſts to paſs from a ſtate of reſt to motion than to return again from that motion to the ſame ſtate of reſt: beſides, any quieſcent body may be moved by any force; and an equal force, acting in a contrary direction, will be able to deſtroy that motion; and in this, this indifference conſiſts.

Since, according to this law, a body once in motion always continues in that motion, the philoſophers aſk, Why all projectiles loſe by degrees their motion? Why do they not proceed in infinitum? If motion did not of its own nature decay, a ſtone thrown at the beginning of the world, would by this time have gone through an immenſe and almoſt infinite ſpace. And ſo indeed it would, if its motion had been in vacuo, or in free ſpaces, and without any gravity. But ſince all projectiles are carried either thro' the air, or on the rough ſurfaces of other bodies, they muſt be neceſſarily retarded: for ſince all bodies in motion muſt drive and thruſt out of its place the reſiſting air, or overcome the roughneſs of the ſuperficies upon which they are moved, they will loſe all that force and motion that is conſtantly employed in overcoming theſe obſtacles, and conſequently the motion of projectiles will be continually diminiſhed: but if there was no reſiſtance in the medium, no roughneſs in the ſuperficies on which they were moved, no gravity that continually forces the bodies towards the earth, motion would always continue the ſame, without any retardation at all. So in the heavens, where the medium is exceedingly rare, the planets do continue their motions for a very long time; and upon ice, or any other very ſmooth ſurface without any roughneſs, heavy bodies in motion are not ſoon brought to reſt.

INFALLIBLE, ſomething that cannot err, or be deceived. See ERROUR.

One of the great controverſies between the proteſtants and papiſts, is the infallibility which the latter attribute to the pope; though, in fact, they themſelves are not agreed on that head, ſome placing this pretended infallibility in the pope and a general council. See the articles COUNCIL and POPE.

INFAMY, in law, is a term which extends to forgery, perjury, groſs cheats, &c. by which a perſon is rendered incapable of being a witneſs or juror, even tho' he is pardoned for his crimes. See the articles FORGERY, PERJURY, &c.

INFANT, *infans*, in medicine, denotes a young child. See the article CHILD and DELIVERY.

It being a matter of great importance how tender infants are treated, we ſhall lay down ſome rules for the direction of the diet, regimen, and other non-naturals, as well with regard to the infant as the nurſe.

As ſoon, therefore, as the child is brought into the world, it ought, immediately after the ligature and cutting off the umbilical veſſels, to be waſhed in a warm bath, prepared of water alone, or a mixture of wine and water. The midwife too ſhould be allowed a convenient place and time to examine the child, and ſet to rights any parts that may be ill-formed by the birth. She ſhould likewiſe ſtroke the belly with the hollow of her hand, in order to excite a diſcharge of the fæces. If the new-born infant is found to be weakly, it ſhould be refreſhed by waſhing it with warm wine, rubbing it gently, anointing the breaſt, back, and crown of the head with ſome analeptic ſpirits; or by breathing ſtrongly into its mouth, after chewing cloves and other aromatics; or giving it a ſmall quantity of rheniſh wine, or cinnamon-water. Great caution is alſo neceſſary in ſwadling the infant, leſt out of negligence or ignorance, it receive any injury by this means: for beſides that infants frequently become hump-backed from too great a ſtricture of the breaſt by bandage, by thus obſtructing the circulation, they fall into a conſumption, and are ſubject to ruptures and many other diſorders.

The next care is, that infants, who for want of a diſcharge by ſtool in the mother's womb, always come into the world with their inteſtines replete with excrements, be ſeaſonably purged. But in caſe the weak nature of the infant ſhould not be ſufficient of itſelf, providence has kindly furniſhed the mother at firſt with thin ſerous milk, whoſe deterging and diluting quality opens the body much better and with greater ſafety than the moſt ſelect evacuants, and no danger is to be dreaded from it, unleſs that milky liquor flows from an impure ſpring; or the mother, from the difficulty of the birth, be agitated by convulſive motions; or unleſs any other circumſtances concur which forbid the uſe of a medicine elaborated by nature in the breaſts of women: in which caſe, if the infant has not a ſtool within twenty-four hours, it may be proper to give it a very ſmall quantity of ſolutive ſyrup of roſes, or a clyſter of whey and honey.

As to a proper diet, milk deſervedly conſtitutes the principal, and the univerſal aliment; becauſe it ſupplies both meat and drink at the ſame time, is grateful to the ſtomach, and for this purpoſe it was wiſely ordered by the Creator, that women, immediately after their delivery, ſhould accumulate a ſufficient quantity of it in their breaſts. As infants are nouriſhed by the breaſts either of the mother or a hired nurſe, it is certainly the duty of parents, and thoſe entruſted with the health of children, to take care that they generate pure and temperate milk. This is beſt obtained by their obſerving an exact method of diet, and avoiding all thoſe things which communicate any taſte to the milk, even imperceptible to the ſenſes, and eſpecially ſuch as are capable of producing diſtempers. Particularly let the nurſe, if there be a neceſſity for one, be healthy, in the flower of her age, from twenty to thirty, rather lean than fat, of good morals, compoſed in mind, neither melancholy, paſſionate, nor a drunkard; nor let her milk be too ſtale; but her diet be regular, and great care muſt be taken that ſhe does not all at once paſs from a hard and ſparing diet, to one that is delicate and plentiful. But nothing leſs than an abſolute neceſſity ſhould prevail on a mother to ſuffer her tender progeny to be delivered up to a mercenary nurſe; ſince this is a barbarity exceeding every thing to be met with in the brute creation: for not only all the diſorders incident to the body, but even thoſe of the mind itſelf, are communicated to the ſucking child.

It often happens that the milk is corrupted by various ſudden cauſes, by which either the mother or the nurſe may be affected: and here precautions are neceſſary to prevent impending danger: the milk is extremely vitiated by the terror of the woman who gives ſuck; and conſequently the beſt preſervative againſt the injury ariſing from it, is not to give the breaſt immediately after a fright. The ſame holds true with reſpect to anger; and ſince the injury done to the milk by violent paſſions, upon its long continuance in the breaſts, endangers both the child and the nurſe, to prevent this, the milk ſhould be ſeaſonably extracted.

It ſometimes happens that either the infant is incapable of ſucking the milk out of the breaſts, or the nurſe, from illneſs, or ſome other cauſe, is incapable of affording it: In this caſe, other proper aliments are to be provided, among which are ſweet whey, barley-broth, water-gruel, emulſions of almonds, barley boiled to the conſiſtence of a pulp, with the addition of the yolk of an egg; ſeveral kinds of pap, made of flour, or crumbs of bread boiled in water, given with or without milk: but chewing victuals and giving it to a child, ought by no means to be allowed; becauſe by ſuch maſtication not only the moſt ſubtle part of the pap is ſucked out, but any infection of the ſaliva and corrupted teeth are eaſily communicated to infants. When children arrive at ſuch an habit as to be capable of digeſting other aliments, care ſhould be taken not to give them food of a hard conſiſtence; they ought not to eat ſalt meat in great quantities, unripe fruit, bread not duly fermented, or too new; nor ought they to eat much of any kind of ſweet meats.

As to the prevention of the diſeaſes in infants, nothing is more uſeful both for the nurſe and the child, than infuſions of ſuch herbs as ſweeten the blood, made in water: and here an infuſion of betony, root of liquorice, fennel-ſeed, and the like, are highly proper. Nor do they act amiſs who ſometimes, after a meal, eat a quantity of fennel or anniſe-ſeed, which increaſes the milk, and prevents gripes in the infant.

Since milk ſtagnating in the ſtomach and duodenum ſoon grows acid and coagulated, and thus excites a thouſand dangerous ſymptoms, the greateſt care ought to be taken to prevent what is attended with ſuch dangerous conſequences; for which purpoſe thoſe powders are extremely efficacous which contain crabs-eyes, egg-ſhells, the root of florentine orris, ſaffron, the ſeeds or oil of anniſe, *&c.* of which a doſe may be given twice or three times a week. And ſince the health of infants greatly depends upon a due and ſufficient diſcharge of the excrements by ſtool, and the preſervation of the tone of the ſtomach and inteſtines, gentle laxatives, if neceſſary, ſhould be ſometimes interpoſed; but ſtrong and acrid purges, as reſin of jalap, ſcammony, black hellebore and the like, are improper and pernicious. They ought not to take aloes on account of the heat it occaſions, nor the leaves of ſenna becauſe of the coſtiveneſs it produces: nor are theſe prejudicial only when given to children, but alſo when given to the nurſes: for being mixed with the milk, they often throw the tender infants into convulſions. Sydenham rightly obſerves, that children, in the firſt month, are often ſeized with the epilepſy from too frequent ſtools; and Galen juſtly aſſerted, that the bodies of children ought not to be exſiccated with purgatives, which would prevent their growing. And, really, it is inexpreſſible how much the tender and weak ſtomachs of new born infants are prejudiced by purgatives.

Diſeaſes of INFANTS may be reduced to the following heads. 1. Retention of the meconium, or firſt ſtools, already taken notice of. 2. Aphthæ, or thruſh, which affect the whole mouth, and even inteſtines: for this Heiſter adviſes a grain or two of mercurius dulcis, given in two drams of ſolutive ſyrup of roſes: he would have the nurſe, likewiſe, take rhubarb, and the abſorbent powders; and externally, Shaw would have the ulcers touched frequently with a mixture of honey of roſes, and oil of vitriol. 3. Chaffing, or galling, of the fleſh, already treated of under the article EXCORIATION. 4. Coſtiveneſs, for which Heiſter recommends two or three grains of rhubarb in ſolutive ſyrup of roſes, or a ſolution of manna, till the child's belly is opened; and afterwards the teſtaceous powders. 5. Coughs of infants ſeldom prove obſtinate, uſually giving way to pectoral ſyrups, or a little ſpermaceti; relaxing the bowels at the ſame time with rhubarb, given in ſolutive ſyrup of roſes. In very bad caſes, a few drops of ſpirit of ſal-armoniac, given pretty often, has a very good effect; and if the child be almoſt choaked, a quarter of a grain of tartar emetic, taken as a vomit, will ſnatch it from the jaws of death. Oil of ſweet almonds is likewiſe very good; as are flowers of ſulphur, in phlegmatic habits. 6. Cruſta Lactea, or ſcabby eruptions, otherwiſe called achores, already treated of under the articles ACHOR and CRUSTA. 7. Atrophy, or conſumption, for the cure of which the crudities of the bowels ſhould be evacuated by gentle laxatives, now and then repeated, to which a few grains of mercurius dulcis muſt always be added; or even the purgative ſalts may be preſcribed. Externally, baths of ſoft-water, with aromatic herbs, with friction of the joints while in the bath, and frequent motion, are recommended. 8. Convulſion, if owing to acrimonious humours in the bowels, is cured by gentle doſes of ſyrup of rhubarb, with the abſorbent powders; but when epileptic, cinnabar is to be given freely in powders; and when owing to worms, mercurius dulcis is the beſt of all medicines. 9. Diarrhœa of infants is already treated of under its proper article. 10. Stoppage of the noſe ſometimes happens, inſomuch that they can ſcarce breathe, ſuck, or ſwallow; for the cure of which, after a ſuitable purge, diſſolve two or three grains of white vitriol in half an ounce of marjoram water; then filtre it, and apply it now and then to the noſtrils with a linen-rag. Or you may apply oil of ſweet almonds, impregnated with oil of marjoram, to the bottom and ſides of the noſtrils, which will reſolve the filth. 11. Running of the eyes and ears is a very common complaint, which is cured by ſmall doſes of the decoction of pimpernel-root, ſaſſafras, and gentle laxatives, in which a grain or two of calomel is mixed. 12. Vomiting is rather accounted ſalutary than otherwiſe; but when too violent, it may be remedied by gentle clyſters. 13. Suppreſſion of urine is cured by giving half a ſcruple of ſome neutral ſalt, as vitriolated tartar, arcanum duplicatum, and the like; but if theſe fail, a catheter muſt be introduced into the bladder, which is much eaſier in girls than boys. 14. Fevers of children, ſee FEVER. 15. Difficulty of teething, ſee DENTITION. 16. Imperforations of the neceſſary parts, ſo that there is no paſſage for the ſtools or urine; in which the aſſiſtance of the ſurgeon muſt be ſpeedily called in, or the infant is loſt. 17. Jaundice, or a yellowneſs of the ſkin, ſee JAUNDICE. 18. Worms in children, ſee WORMS. 19. Rickets ſeldom attack children before they are nine months old, ſee RICKETS. 20. Gripes and other diſorders of the bowels, are generally owing to corrupted milk; the cure of which conſiſts in the uſe of antiacids, mild cathartics, and clyſters of the ſame intention, with gentle carminatives. Sometimes, indeed, the gripes are ſo violent as not to be cured without two drops of the thebaic tincture in a little ſyrup of roſes. Abſorbents are alſo deemed excellent in theſe diſorders, as they cure the gripes, reſtleſſneſs, and watching in infants, as certainly as opium eaſes pain in adults.

Hare-Lip in INFANTS. See LIP.

INFANT, in law, ſignifies a perſon under the age of one and twenty.

An infant may bind himſelf apprentice, and if he ſerve ſeven years, may have the benefit of his trade; but if he be guilty of miſbehaviour, the maſter may give him gentle correction, or complain to a juſtice of peace and have him puniſhed. He may alſo bind himſelf for the payment of neceſſaries, ſuch as meat, drink, waſhing, apparel and learning, though not by bond with a penalty: infants are not obliged to pay for cloaths, unleſs it be proved that they were for their own wearing, and convenient and neceſſary for them to wear according to their degree and eſtate; and though an infant may buy neceſſaries, he cannot borrow money to do it; for the law will not truſt him with money, except at the peril of the lender, who muſt either ſee it thus laid out, or take care to lay it out himſelf in ſuch neceſſaries. If an infant is the defendant in an action, the plaintiff has ſix years to commence his action in after the infant comes of age; and an infant who is a plaintiff, has alſo ſix years, after he comes of age, to ſue, by the ſtatute of limitations. If an infant grants leaſes for a term of years, he may, at his full age, either confirm the leaſe, or bring treſpaſs againſt the leſſee for the occupation. Alſo a leaſe granted to an infant may be avoided by waving the land before the rent day expreſſed therein. An infant may purchaſe lands, where ſuch purchaſe is intended for his benefit, tho' at his full age he may either avoid or confirm ſuch purchaſe; and, in caſe an infant ſell lands by deeds indented and inrolled, he may avoid the ſame. However, infants are bound by all acts of neceſſity, as in preſentations to benefices, admittances and grants of copyhold eſtates, aſſenting to legacies, and conditions annexed to lands, whether an eſtate comes by grant or by deſcent.

INFANTE and INFANTA, all the ſons and daughters of the kings of Spain and Portugal, except the eldeſt; the princes being called infantes, and the princeſſes infantas.

INFANTRY, in military affairs, denotes the whole body of foot ſoldiers. See the article SOLDIER.

INFECTION, among phyſicians, the ſame with contagion. See CONTAGION.

INFERENCE, in matters of literature, a corollary, concluſion, argument, or induction drawn from ſomething that went before. See CONCLUSION, &c.

INFERNAL-STONE, *lapis infernalis.* See the article LAPIS.

INFINITE, that which has neither beginning nor end: in which ſenſe God alone is infinite. See the article GOD.

Infinite is alſo uſed to ſignify that which has had a beginning, but will have no end, as angels and human ſouls. This makes what the ſchoolmen call *infinitum a parte poſt*; as, on the contrary, by *infinitum a parte ante*, they mean that which has an end but had no beginning.

INFINITE, or INFINITELY GREAT LINE, in geometry, denotes only an indefinite or indeterminate line, to which no certain bounds, or limits, are preſcribed.

INFINITE QUANTITIES. The very idea of magnitudes infinitely great, or ſuch as exceed any aſſignable quantities, does include a negation of limits: yet if we nearly examine this notion, we ſhall find that ſuch magnitudes are not equal among themſelves, but that there are really beſides infinite length and infinite area, three ſeveral ſorts of infinite ſolidity; all of which are *quantitates ſui generis*, and that thoſe of each ſpecies are in given proportions.

Infinite length, or a line infinitely long, is to be conſidered either as beginning at a point, and ſo infinitely extended one way, or elſe both ways from the ſame point; in which caſe the one, which is a beginning infinity, is the one half of the whole, which is the ſum of the beginning and ceaſing infinity; or, as may be ſaid, of infinity *a parte ante* and *a parte poſt*, which is analogous to eternity in time and duration, in which there is always as much to follow as is paſt, from any point or moment of time: nor doth the addition or ſubduction of finite length, or ſpace of time, alter the caſe either in infinity or eternity, ſince both the one or the other cannot be any part of the whole.

As to infinite ſurface, or area, any right line, infinitely extended both ways on an infinite plane, does divide that infinite plane into equal parts, the one to the right, and the other to the left of the ſaid line; but if from any point, in ſuch a plane, two right lines be infinitely extended, ſo as to make an angle, the infinite area, intercepted between thoſe infinite right lines, is to the whole infinite plane as the arch of a circle, on the point of concourſe of thoſe lines as a center, intercepted between the ſaid lines, is to the circumference of the circle; or, as the degrees of the angle to the 360 degrees of a circle: for example, right lines meeting at a right angle do include, on an infinite plane, a quarter part of the whole infinite area of ſuch a plane.

But if two parallel infinite lines be ſuppoſed drawn on ſuch an infinite plane, the area intercepted between them will be likewiſe infinite; but at the ſame time will be infinitely leſs than that ſpace, which is intercepted between two infinite lines that are inclined, though with never ſo ſmall an angle; for that, in the one caſe, the given finite diſtance of the parallel lines diminiſhes the infinity in one degree of dimenſion; whereas, in a ſector there is infinity in both dimenſions: and conſequently the quantities are the one infinitely greater than the other, and there is no proportion between them.

From the ſame conſideration ariſe the three ſeveral ſpecies of infinite ſpace or ſolidity; for a parallelopiped, or a cylinder, infinitely long, is greater than any finite magnitude, how great ſoever; and all ſuch ſolids, ſuppoſed to be formed on given baſes, are as thoſe baſes in proportion to one another. But if two of theſe three dimenſions are wanting, as in the ſpace intercepted between two parallel planes infinitely extended, and at a finite diſtance, or with infinite length and breadth, with a finite thickneſs, all ſuch ſolids ſhall be as the given finite diſtances one to another; but theſe quantities, though infinitely greater than the other, are yet infinitely leſs than any of thoſe wherein all the three dimenſions are infinite. Such are the ſpaces intercepted between two inclined planes infinitely extended; the ſpace intercepted by the ſurface of a cone, or the ſides of a pyramid, likewiſe infinitely continued, &c. of all which notwithſtanding, the proportions one to another, and to the τὸ πᾶν, or vaſt abyſs of infinite ſpace (wherein is the locus of all things that are or can be; or to the ſolid of infinite length, breadth and thickneſs taken all manner of ways) are eaſily aſſignable; for the ſpace between two planes is to the whole as the angle of thoſe planes to the 360 degrees of the circle. As for cones and pyramids, they are as the ſpherical ſurface intercepted by them is to the ſurface of the ſphere, and therefore cones are as the verſed ſines of half their angles to the diameter of the circle: theſe three ſorts of infinite quantity are analogous to a line, ſurface, and ſolid; and, after the ſame manner, cannot be compared, or have no proportion the one to the other.

INFINITESIMALS, among mathematicians, are defined to be infinitely ſmall quantities.

In the method of infiniteſimals, the element, by which any quantity increaſes or decreaſes, is ſuppoſed to be infinitely ſmall, and is generally expreſſed by two or more terms, ſome of which are infinitely leſs than the reſt, which being neglected as of no importance, the remaining terms form what is called the difference of the propoſed quantity. The terms that are neglected in this manner, as infinitely leſs than the other terms of the element, are the very ſame which ariſe in conſequence of the acceleration, or retardation, of the generating motion, during the infinitely ſmall time in which the element is generated; ſo that the remaining terms expreſs the elements that would have been produced in that time, if the generating motion had continued uniform: therefore thoſe differences are accurately in the ſame ratio to each other as the generating motions or fluxions. And hence, though in this method infiniteſimal parts of the elements are neglected, the concluſions are accurately true without even an infinitely ſmall error, and agree preciſely with thoſe that are deduced by the method by fluxions.

For example, (pl. CXLVI. fig. 1. n° 1.) when DG, the increment of the baſe AD, of the triangle ADE, is ſuppoſed to become infinitely little, the trapezium DGHE (the ſimultaneous increment of the triangle) conſiſts of two parts, the parallelogram EG, and the triangle EIH; the latter of which is infinitely leſs than the former, their ratio being that of one half DG to AD: therefore, according to this method in fluxions, the part EIH is neglected, and the remaining part, viz. the parallelogram EG is the difference of the triangle ADE. Now it was ſhewn, (ſee the article FLUXIONS,) that EG is preciſely that part of the increment of the triangle ADE which is generated by the motion with which this triangle flows, and that EIH is the part of the ſame increment which is generated in conſequence of the acceleration of this motion, while the baſe, by flowing uniformly, acquires the augment DG, whether DG be ſuppoſed finite or infinitely little.

Example 2. The increment DELMHG (*ibid.* n° 2.) of the rectangle AE, conſiſts of the parallelograms EG, EM, and I*b*; the laſt of which, I*b*, becomes infinitely leſs than EG or EM, when DG and LM, the increments of the ſides, are ſuppoſed infinitely ſmall; becauſe I*b* is ſuppoſed to EG as LM to AL, and to EM as DG to AD; therefore, I*b* being neglected, the ſum of the parallelograms EG and EM is the difference of the rectangle AE: and the ſum of EG and EM is the ſpace that would have been generated by the motion with which the rectangle AE flows continued uniformly, but that I*b* is the part of the increment of the rectangle which is generated in conſequence of the acceleration of this motion, in the time that AD and AL, by flowing uniformly, acquire the augments DG and LM. The ſame may be obſerved in propoſitions wherein the fluxions of quantities are determined; and thus the manner of inveſtigating the differences, or fluxions of quantities, in the method of infiniteſimals, may be deduced from the principles of the method of fluxions. For inſtead of neglecting EIH becauſe it is infinitely leſs than EG, n° 1. (according to the uſual manner of reaſoning in that method) we may reject it; becauſe we may thence conclude, that it is not produced in conſequence of the generating motion DG, but of the ſubſequent variations of this motion. And it appears why the concluſions in the method of infiniteſimals are not to be repreſented as if they were only near the truth, but are to be held as accurately true.

In order to render the application of this method eaſy, ſome analogous principles are admitted, as that the infinitely ſmall elements of a curve are right lines, or that a curve is a polygon of an infinite number of ſides, which being produced, give the tangents of the curve; and by their inclination to each other meaſure the curvature. This is as if we ſhould ſuppoſe, when the baſe flows uniformly, the ordinate flows with a motion which is uniform for every infinitely ſmall part of time, and increaſes or decreaſes by infinitely ſmall differences at the end of every ſuch time.

But however convenient this principle may be, it muſt be applied with caution and art on various occaſions. It is uſual therefore, in many caſes, to reſolve the element of the curve into two or more infinitely ſmall right lines; and ſometimes it is neceſſary, if we would avoid error, to reſolve it into an infinite number of ſuch right lines, which are infiniteſimals of the ſecond order. In general, it is a poſtulatum in this method, that we may deſcend to the infiniteſimals of any order whatever, as we find it neceſſary; by which means, any error that might ariſe in the application of it may be diſcovered

and

Fig. 1. INFINITESIMALS.

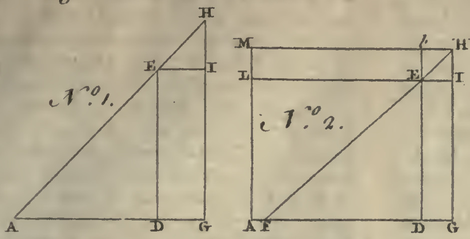


Fig. 2. INFLECTION

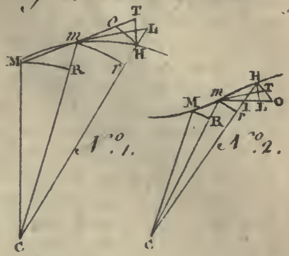
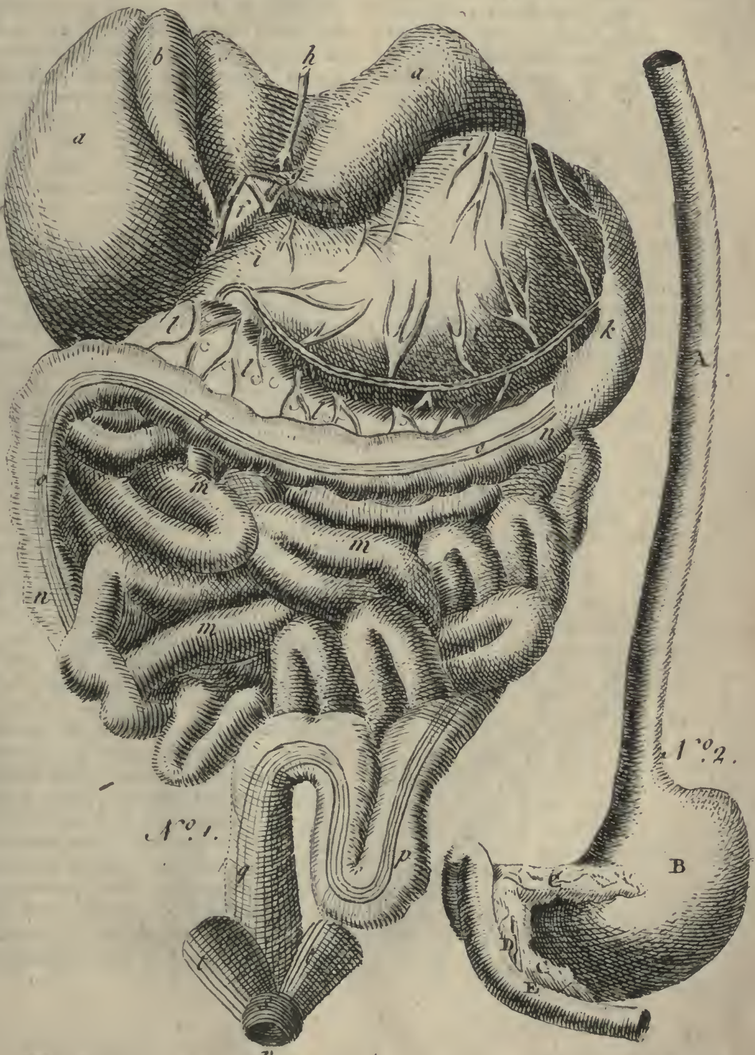


Fig. 3. INTESTINES.



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and corrected by a proper uſe of this method itſelf. For an example of this, ſee Maclaurin's Fluxions, article 498.

It is likewiſe to be obſerved, when the value of a quantity that is required in a philoſophical problem becomes, in certain particular caſes, infinitely great or infinitely little, the ſolution would not be always juſt though ſuch magnitudes were admitted. As when it is required to find by what centripetal force a curve could be deſcribed about a fixed point that is either in the curve, or is ſo ſituated, that a tangent may be drawn from it to the curve, the value of the force is found infinite at the center of the forces in the former caſe, and at the point of contact in the latter; yet it is obvious, that an infinite force could not inflect the line deſcribed by a body that ſhould proceed from either of theſe points, into a curve; becauſe the direction of its motion in either caſe paſſes thro' the center of the forces, and no force, how great ſoever, that tends towards the center could cauſe it to change that direction. But it is to be obſerved, that the geometrical magnitude by which the force is meaſured, is no more imaginary in this than in other caſes, where it becomes infinite; and philoſophical problems have limitations that enter not always into the general ſolution given by geometry.

But to obviate theſe ſcruples, which the brief manner of proceeding in the method of infiniteſimals is apt to ſuggeſt to ſuch as enter on the higher parts of geometry, after having been accuſtomed to a more ſtrict and rigid kind of demonſtration in the elementary parts. To ſuch it may ſeem not to be conſiſtent with the perfect accuracy that is required in geometrical demonſtration, that, in determining the firſt differences, any part of the element of the variable quantity ſhould be rejected, merely becauſe it is infinitely leſs than the reſt, and that the ſame part ſhould be afterwards employed for determining the ſecond and higher differences, and reſolving ſome of the moſt important problems. Nor can we ſuppoſe that their ſcruples will be removed, but rather confirmed, when they come to conſider what has been advanced by ſome of the moſt celebrated writers on this method, who have expreſſed their ſentiments concerning infinitely ſmall quantities in the preciſeſt terms; while ſome of them deny their reality, and conſider them only as incomparably leſs than finite quantities, in the ſame manner as a grain of ſand is incomparably leſs than the whole earth; and others repreſent them, in all their orders, as no leſs real than finite quantities. From what has been ſaid, it will appear that a ſatisfactory account may be given for the more brief way of reaſoning uſed in the method of infiniteſimals; and that then we inveſtigate the firſt differences, we may reject the infiniteſimal part of the element, not merely becauſe they are infinitely leſs than the other parts; but becauſe the quantities generated, and their mutual relations, depend upon the generating motions, and are diſcovered by them. The ſame infiniteſimal parts of the element, however, may ſerve for meaſuring the acceleration or retardation of thoſe motions from that term, or the powers which may be conceived to accelerate or retard them at that term: and here the infinitely ſmall parts of the element that are of the third order, are neglected for a ſimilar reaſon, being generated only in conſequence of the variation of thoſe powers from that term of the time. In this manner we preſume ſome ſatisfaction may be given to the ſcrupulous (who may be apt to demur at the uſual way of reaſoning in this method) while nothing is neglected without accounting for it; and thus the harmony may appear to be more perfect betwixt the method of fluxions and that of infiniteſimals.

But, however ſafe and convenient this method may be, ſome will always ſcruple to admit infinitely little quantities, and infinite orders of infiniteſimals, into a ſcience that boaſts of the moſt evident and accurate principles, as well as of the moſt rigid demonſtrations; and therefore in this article, more unexceptionable poſtulata have been uſed. In order to avoid ſuch ſuppoſitions, Sir Iſaac Newton conſiders the ſimultaneous increments of the flowing quantities as finite, and then inveſtigates the ratio, which is the limit of the various proportions, which thoſe increments bear to each other, while he ſuppoſes them to decreaſe together, till they vaniſh; which ratio is the ſame with the ratio of fluxions.

INFIRMARY, a kind of hoſpital, where the weak and ſickly are properly taken care of. See HOSPITAL.

INFLAMMABILITY, that property of bodies, which diſpoſes them to kindle, or catch fire. See the articles FIRE, FLAME, HEAT, &c.

According to Dr. Shaw, the oil, contained in bodies, is the ſole principle of their inflammability. See **Fuel.**

From many experiments Boerhaave found, that all thoſe parts of vegetables, which are capable by fire of making a true flame, are eaſily miſcible among each other, when pure, ſimple, and inflammable. Thus alcohol, which is the only known body perfectly inflammable, however prepared, provided it be pure, may be intimately mixed with any other alcohol prepared in any other manner, without the leaſt alteration thence ariſing. So alſo all pure oils, when rightly purged of other parts, will mix thoroughly with each other. Nay, all the pureſt oils, and even alcohol itſelf, may be ſo accurately mixed together, as to form one homogeneous fluid, in which the beſt microſcopes ſhall not be able to diſcern the leaſt diverſity of parts; which, however, is to be underſtood with this reſtriction, that there be not the ſmalleſt drop of water in ſuch oil or alcohol. So alſo camphor, which may be reckoned among the vegetable ſolids, burns wholly away, diſſolves and mixes intimately, not only in alcohol, but in any pure oil: and the like holds of other perfectly inflammable vegetables, which mix in oils or alcohol the more thoroughly, as they are more entirely inflammable. The ſame holds of reſins, balſams, and gum-reſins, which, when mixed under the conditions above ſpecified, may be liquified even by a ſmall degree of heat, or even run ſpontaneouſly. Nor muſt it be omitted, that all perfectly inflammable bodies contain certain viſcid parts, which produce a briſk coheſion; and that many of them are incapable of being frozen by any degree of cold hitherto known, as appears in linſeed oil. See **Cold, Frost, Freezing, Oil,** and **Alcohol.**

But what appears moſt wonderful in regard to the inflammability of bodies, is the production of actual flame by the mixture of two cold liquors. The mixture which moſt conſtantly and happily produces this effect, is oil of turpentine with an aqua fortis, made in the following manner: take two pounds of dried and powdered nitre, which mix with one pound of concentrated oil of vitriol, or of common oil of vitriol of a ſufficient ſtrength: diſtil this mixture in a retort with a reverberatory fire, and the liquor thereby raiſed will be an aqua fortis, capable of producing fire and flame with oil of turpentine without any farther aſſiſtance. But without being at the trouble of making an aqua fortis on purpoſe, if well dephlegmated ſpirit of nitre be mixed with a ſufficient quantity of well rectiſied oil of vitriol, this mixture will give fire very readily with oil of turpentine, or any other aromatic oil. The proportions are an ounce of the ſpirit of nitre, half an ounce of the oil of vitriol, and an ounce of oil of turpentine; tho' Mr. Geoffroy tells us, he has ſucceeded very well with a dram of ſpirit of nitre, a dram of oil of vitriol, and three drams of oil of turpentine. This experiment, performed with turpentine inſtead of its oil, is extremely diverting, as the flame not only continues longer, but there are a great many ſucceſſive exploſions.

INFLAMMATION, in ſurgery and medicine, is defined to be a preſſure and attrition of the red arterial blood, ſtagnating in the ſmalleſt canals, produced by the motion of the reſt of the blood, thrown into a violent and forcible commotion, by means of a fever. See the article **Fever.**

This definition of an inflammation is taken from its cauſes. Others define it from its ſymptoms to be a ſpecies of tumour attended with a burning heat, pain, redneſs, reſiſtance, and a continual pulſation and pricking. See **Tumour.**

Inflammations are either external, being ſuch as fall properly under the buſineſs of ſurgery, and are cured by manual operations and topical remedies; or internal, being ſuch whoſe cure is to be expected chiefly from the uſe of internal remedies.

General diviſion of external **Inflammations.** External inflammations, ſeated in the common integuments, are generally termed phlegmons but when ſlighter, they are called furuncles. The inflammation which is not fixed deep, but only ſpreads ſuperficially on the ſkin, is uſually diſtinguiſhed by the name of an eryſipelas; and the inflammatory tumour that ariſes at the finger-ends, is termed paronychia; when the inflammation fixes in the groin or armpits, the tumour is called a bubo; when under the ears, parotis. If an inflammation ſeizes the hands and feet from extreme cold, chilblains ariſe: other inflammations have alſo particular names, according to the particular part of the body they poſſeſs.

General cauſes of external INFLAMMATIONS. The cauſe of a phlegmon, or an external inflammation, ariſes generally from too thick or viſcid a ſtate of the blood, ſtagnating in the anaſtomoſes of the ſmalleſt arteries and veins; ſo that the blood being ſent in larger quantities than it can paſs through thoſe veſſels, muſt of conſequence excite the fore-mentioned general ſymptoms of an inflammation, and muſt occaſion great diſorders at every part where ſuch ſtagnation is made. And tho' no part of the body, whether external or internal, nor the bones themſelves are exempt from this kind of inflammation, yet it more frequently happens in the fat and glands than any where elſe.

With regard to the cauſe whence that inſpiſſation and ſtagnation in thoſe veſſels proceeds, they are, according to Heiſter, of two kinds, of which the firſt may be called external, and the latter internal. Among the external cauſes are placed in the firſt rank all wounds, fractures, luxations contuſions, punctures by thorns and ſplinters, with a too great compreſſion of the veſſels, whether by too ſtrict a bandage, or otherwiſe. To theſe cauſes may be added burns of all ſorts, extreme cold, too violent a motion of the body, the external or internal application of too ſharp and ſtimulating ſubſtances, ſticking plaſters, oily and fat things, with abundance of the like nature, which ſtop up the pores of the ſkin, and impede the free courſe of the blood. Amongſt the internal cauſes, the ſame author reckons any thing acrimonious in the fluids, as in the ſcurvy; as alſo from the blood's abounding in too great quantities, or being of too thick a conſiſtence; or laſtly, when it circulates in the body with too violent a motion: for by this means the groſſer particles of the blood are drove, and, as it were, wedged into ſmaller veſſels, than they can readily find a paſſage through, and this, more eſpecially, when a ſudden cold is ſpread over a body that is in a great heat. In ſhort, every thing will produce an obſtruction which makes the parts of the blood too groſs and bulky, or too much contracts the mouth of the ſmall veſſels.

General criſes and cure of INFLAMMATIONS. Inflammations terminate variouſly, according to their different degrees of violence, the cauſes from whence they ariſe, the parts which they affect, and the particular conſtitution of the patient, with ſeveral other circumſtances which alſo preſage to us what ſhall be the end of the inflammation. But the ſeveral ways wherein an inflammation terminates are chiefly four. It is either, 1. ſo diſperſed and reſolved as to vaniſh without leaving any conſiderable injury in the part affected, and which afterwards recovers its former vigour, and is of all others, the beſt courſe it can take; or elſe, 2. the inflammation ſuppurates, and degenerates into an abſceſs, ſo as to leave ever after ſome damage in the organ; or elſe, 3. the inflammation degenerates into a gangrene, or ſphacelus; or laſtly, into a hard tumour, commonly called a ſcirrhus, which grows more compact in the part affected, as the inflammation remits or goes off.

As to the reſolution and diſperſion of an inflammation, that is uſually practicable, when it is only of a milder kind, in a ſound habit of body, when the blood is not yet too viſcid nor vehement in its motion; and this treatment we have delivered already under the article DISPERSION.

But ſuppuration follows, when the inflammation is more violent, the circulation more rapid, but yet the maſs of blood ſomewhat temperate, and without much acrimony: the treatment of an inflammation that terminates in a ſuppuration, the reader will find delivered under the articles SUPPURATION, ABSCESS, *&c.*

When the forementioned ſymptoms are much more violent, and when the blood is at the ſame time more acrimonious and rapid than it ought to be, the inflammation generally terminates in a gangrene, the nature and treatment of which ſee under the article GANGRENE. But if the inflamed part be full of glands, and the blood very thick, glutinous, and inſpiſſated, the ſmall blood-veſſels are then ſo ſtrongly ſtuffed up with the glutinous blood, that they are compacted together, the parts loſe their ſenſation, and are converted into a hard tumour, which is thence called a ſcirrhus. See the article SCIRRHUS.

INFLAMMATION *in the breaſts*, a diſorder moſt incident to child-bearing women, and almoſt conſtantly happens in a few days after their delivery.

If the milk ſhould be propelled too plentifully and forcibly into the breaſt, which at ſuch times frequently happens; and if the mother ſhould then be ſeized with cold, fear, anger, or a ſudden perturbation of mind, the ſanguiferous and lactiferous veſſels being thence obſtructed, the breaſts muſt then become inevitably tumified, which will be attended with great heat, redneſs, reſiſtance, and violent pain. The ſame accident often happens to women that give ſuck, even a long time after their lying in, and is ſometimes the caſe of thoſe who have no milk, all proceeding from the cauſes already mentioned; and Heiſter gives us an inſtance of a man's breaſt being inflamed by means of a great fright. Theſe inflammations do not, according to that author, always happen to be equally intenſe and violent; for ſometimes it ſeizes the whole breaſt; ſometimes only one ſide; and at another times occupies only a ſmall part of the breaſt: ſometimes the inflammation lies very near the ſkin; at other times very deep; and at one time it has urgent ſymptoms, and at another, it ſits eaſy on the part.

This diſorder may be ſpeedily removed in women of condition, and ſuch as do not ſuckle their children, if ſome of the plaſter of ſperma ceti ſpread on linen be applied warm all round the breaſt ſoon after parturition; being perforated in the middle, to tranſmit the papilla or nipple; the acceſſion of the milk being alſo repelled by a very ſtrait bandage. Among the internal remedies, the moſt proper are ſuch as bring down the lochia puerperarum, when they do not flow in ſufficient plenty of themſelves: the principal remedies for this purpoſe are the eſſence of myrrh, amber, the eſſence of ſaffron, elixir proprietatis, &c. Laſtly, with reſpect to the proper drink, it muſt be carefully obſerved to diminiſh the quantity of milk by ſmalneſs and poverty of the meat and drink, upon which account the patient ſhould be recommended to drink ſmall broth, tea, or the like watery liquors: and if the mother be deſirous of ſuckling the infant, there can be no better preſervative againſt the inflammations of the breaſts. But when the inflammation is fixed the cure muſt be attempted either by diſperſion or ſuppuration, for the methods of which ſee DISPERSION and SUPPURATION.

But if it happens that the tumour will neither yield to diſperſion nor ſuppuration, and is in danger of turning to a ſcirrhus, or cancer, the patient muſt be kept in good ſpirits, and the plaſter of ſperma ceti be conſtantly retained on the tumour, by which means it will probably either grow leſs or elſe vaniſh.

For other kinds of external inflammations, ſee the articles FURUNCLE, ERYSIPELAS, PARONYCHIA, BUBO, PAROTIS, &c.

But internal inflammations, or ſuch whoſe cure is to be expected chiefly from the uſe of internal remedies, are in particular as follow.

INFLAMMATION *of the bladder*, that attended with an acute, burning, preſſing pain, in the region of the pubes, a fever, and a continual teneſmus, or deſire of going to ſtool, and a perpetual ſtriving to make water.

Other ſymptoms of this diſeaſe are a rumbling of the bowels, griping pains, great anxiety of the precordia, difficult breathing, want of appetite, and vomiting, coldneſs of the extreme parts, a hard, quick, unequal, contracted pulſe, inquietude, and ſometimes convulſions.

There is another kind which is more ſuperficial, and is either rheumatic or eryſipetalous, in which the fever is more eaſily and ſpeedily cured, by promoting a diaphoreſis; and perſons in years, who are affected with the ſcurvy, gout, rheumatiſm, or violent head-achs, are moſt ſubject to it, eſpecially if they catch cold from a north wind. The former ariſes commonly from the ſtoppage of the menſes, bleeding, piles, or other uſual ſanguinary evacuations, and not ſeldom from a violent gonorrhœa, unſkillfully ſuppreſſed by aſtringents; or when treated by medicines of too ſharp and hot a nature.

This diſeaſe is mortal, if it terminates in an ulcer, or mortification: the latter is immediate death.

The cure muſt be attempted, ſays Hoffman, with bleeding in the foot, if a ſuppreſſion of the menſes or hæmorrhoidal flux be the cauſe. If it proceeds from the ſcurvy, &c. recourſe muſt be had to gentle diaphoretics, diluents, and remedies which obtund the acrimony of the humours, ſuch as decoctions of the root of ſcorzonera, china, ſkirrets, and fennel. Alſo infuſions in the manner of tea of the tops of yarrow, flowers of mallows, winter cherries, and ſeed of daucus made with milk, and ſweetened with ſyrup of marſhmallows. To theſe may be added emulſions of the four cold ſeeds. If the patient is coſtive, manna will be proper with antimoniated nitre, to which rhubarb may be joined, as occaſion requires.

If the diſeaſe is violent, diaphoretic powders with nitre, in a larger proportion than ordinary, as alſo five grains of ſaffron, and two of camphire, with the emulſions aforeſaid. Externally antiſpaſmodics and gentle diſcutients will be proper; for which purpoſe it was Hoffman's method to apply bladders, filled with a decoction of emollient flowers. If the teneſmus and difficulty of urine ariſe from ſpaſms, there is nothing better than the vapours of a decoction in milk in the flowers of melilot, elder, chamomile and mallows, and the tops of yarrow. This decoction may be put into a cloſe ſtool, and the patient ſit over it.

INFLAMMATION *of the brain.* See the article PHRENSY.

INFLAMMATION *of the diaphragm.* See the article PARAPHRENITIS.

INFLAMMATION *of the eyes.* See the article OPHTHALMIA.

INFLAMMATION *of the fauces.* See the article QUINZY.

INFLAMMATION *of the inteſtines*, according to Boerhaave, is an inflammation contracting the inteſtines, and ſtopping up the paſſage thro' them; attended with a vehement fixed, burning pain, which is irritated by things taken inwardly. When the inflammation is in the upper part of the inteſtines, the ſtomach will be greatly diſtended with wind. When the pain is exaſperated, it produces convulſions of the diaphragm and abdominal muſcles, vomiting, and painful inflations, with rumblings and ſharp griping pains, which may bring on the iliac paſſion, or twiſting of the guts. Hoffman ſays, that when there is a burning pain in the abdomen, with a preternatural heat of the whole body, as alſo a quick pulſe, loſs of ſtrength, anxiety and inquietude, the ſeat of the diſeaſe may juſtly be ſuſpected to be in the inteſtines. If the pain is above the navel, and below the ſtomach, attended with a fever, nauſea, and reaching, it is a ſign that that part of the colon is affected, which lies beneath the ſtomach, and is extended from the right to the left ſide. If the pain lies in the right hypochondrium, under the ſpurious ribs, it ſhews that part of the colon to be inflamed where it joins with the ilium. When the complaint is on the left ſide, under the loins, where the pſoas muſcle is placed, it is a ſign that the colon, and that part of the meſentery joined thereto, is the ſeat of the diſeaſe, eſpecially when it adheres to the peritonæum: but when the pain is in the middle of the abdomen about the navel, it ſhews the ſmall guts are certainly affected. In all which caſes the pain is ſuppoſed to be attended with a fever.

Arbuthnot adviſes, that this diſeaſe be carefully diſtinguiſhed from a colic, proceeding from a cold cauſe, becauſe what is good for the latter is poiſon in the former. It muſt have a ſpeedy remedy, or it will ſoon, according to that writer, end in the iliac paſſion, or a mortification. Beſides copious bleeding, he thinks, there is ſcarcely any other method of cure than fomenting and relaxing the bowels with emollient liquids taken warm, both by the mouth and in clyſters, and this every hour. Warm fomentations, or young, vigorous, and ſound animals applied to the body are extremely beneficial.

Boerhaave directs that the patient ſhould only be nouriſhed with broth, in which gently detergent roots have been boiled. After bleeding and clyſters, if the pain continues violent, Hoffman is of opinion that there will be no manner of danger in giving opiates, by which means the excruciating pain will be alleviated, and the ſpaſms appeaſed, and a breathing ſweat will follow. When this is done, and the fever abated, there will be no occaſion to continue the dilating, relaxing and moiſtening medicines, but rather the nervous and corroborating; ſuch as the preparations of amber, eſpecially the ſalt and tincture; the former of which may be given in a bolus from ſix to ſixteen grains, and the latter from twenty to eighty drops, in any convenient vehicle.

If the patient ſurvives three days, and the acuteneſs of the pain abates with a chilneſs and ſhivering throughout the body, it is a ſign of a ſuppuration, and within fourteen days the impoſthume will break, and if it falls into the cavity of the abdomen, it will corrupt the whole maſs of fluids, putrify the viſcera, and turn to an aſcites, whence the patient will die of a conſumption. In this caſe, Boerhave and Arbuthnot recommend whey and chalybeat waters, as likely to prove moſt beneficial. The impoſthume may alſo turn either to a gangrene or ſcirrhus, both which are mortal.

INFLAMMATION *of the kidneys.* See the article NEPHRITIS.

INFLAMMATION *of the liver.* When the

liver is inflamed, it compreſſes the ſtomach, diaphragm, and the neighbouring viſcera of the abdomen; it ſtops the circulation of the fluids, hinders the generation and excretion of the gall, and all digeſtion; it produces a great many bad ſymptoms, as the jaundice, with all the diſeaſes depending thereon. See the article HEPATITIS.

A fever, an inflammation, and pungent pain on the region of the liver, and diaphragm, a tenſion of the hypochondria, yellowneſs of the ſkin and eyes, and a ſaffron-coloured urine, are ſigns of an inflammatory diſpoſition of the liver. See the article JAUNDICE.

This diſeaſe terminates as other inflammations; being cured by reſolution, concoction, and excretion, of the morbid matter; or it terminates in an abſceſs, ſcirrhus, or gangrene. See the articles ABSCESS, *&c.*

During the firſt ſtate, Arbuthnot tells us, that a warm regimen and ſaffron, which ſome reckon a ſpecific, are improper. On the other hand, that cooling, reſolving liquors, taken inwardly, as whey and ſorrel boiled in it, outward fomentations, and frequent injections of clyſters, bathing and frictions, relax and render the matter fluid. Honey with a little rheniſh wine and vinegar, the juices and jellies of ſome ripe garden-fruits, and thoſe of ſome lacteſcent plants, as endive, dandelion, and lettuce, are reſolvent. Violent purging hurts; gently relaxing the belly relieves, diluents with nitrous ſalts are beneficial, or tamarinds boiled in warm water, or whey. The feveriſh matter is often carried off by urine, and therefore diuretics not highly ſtimulating are proper.

If the inflammation be recent, extremely violent and without any ſigns or hopes of reſolution, concoction, and excretion, Boerhaave adviſes, that the caſe be treated with the ſame cautions and remedies as is directed in pleuriſies, and other ſimular inflammatory diſorders; ſuch remedies only excepted, as the ſituation of the part affected cannot admit of, except only, that all antiphlogiſtic fluids, either drank or injected by clyſters, are particularly ſerviceable in the caſe before us.

INFLAMMATION *of the lungs.* See the article PERIPNEUMONY.

INFLAMMATION *of the pleura.* See the article PLEURISY.

INFLAMMATION *of the ſtomach* is known by a burning, fixed, and pungent pai in the ſtomach, which is exaſperated a the inſtant any thing is taken into it, an is ſucceeded by a moſt painful vomitin and hiccough. There is, beſides, an inward heat, anxiety, and a tenſive pai about the precordia, an acute continu fever, great thirſt, difficult breathing inquietude, toſſing of the body, coldne of the extreme parts, a hard, contracte quick, and ſometimes, unequal pulſ In the medical eſſays, we have an inſtance of this diſeaſe being attended wit a hydrophobia. See HYDROPHOBIA Boerhaave ſays, that this diſeaſe, if n ſuddenly cured, is generally mortal therefore, that as ſoon as it is diſcovere plentiful bleeding is neceſſary, that th patient's drink ſhould be very ſoft, ant phologiſtic, and emollient; and alſo th clyſters of the ſame kind ſhould be adm niſtered to him.

Arbuthnot adviſes, that the patie ſhould totally abſtain from every thin that has acrimony in it; even the coolin nitrous ſalts, which are beneficial in othe inflammations, irritate too much. Vomit cordials, and ſpirituous liquors, are littl better than poiſon: milk generally curdle Aliments muſt be given frequently, an by a ſpoonful at a time, for any diſtenſion increaſes the inflammation. A thin gruel of barley, oatmeal, whey, wit a very little ſugar, or honey, or chicke broths, are proper aliments: whey-emulſions, barley-water, and emollient decoctions are proper drinks. If poiſons of th cauſtic kind or metallic medicines ill prepared cauſe the inflammation, oily fa things are proper, as new milk, cream oil of ſweet almonds, or oil of olive taken often and plentifully, according t Hoffman. If in the cholera morbus a inflammation is apprehended, he adviſe abſorbents and burnt hart's horn, wit gelatinous decoctions of calves and neat feet, or hartſhorn-jellies, and water-gruel Outwardly he recommends the followin liniment as uſeful in all caſes; take oi of ſweet almonds, two ounces; camphire one dram; make a liniment, with whic anoint frequently the precordia, applyin a hot linen-cloth over it. The following epithem he recommends as an excellent diſcutient and ſudorific. Take o the vinegar of roſes, two ounces; ſpiri of wine camphorated, two drams; tincture of ſaffron, and tincture of caſtor of each one dram; nitre, half a dram let this epithem be applied warm to the region of the ſtomach.

If there happens an impoſthume, honey, and even honey of roſes, taken inwardly, is according to Arbuthnot, a good cleanſer; and decoctions of comfrey-roots, healing.

NFLAMMATION of the tonſils. See the article TONSILS.

NFLAMMATION *of the womb or uterus*, appears from extraordinary heat and a fixed pain in the groin, with an acute fever, a pain in the loins and belly, an inflation of the abdomen, a ſtimulus to make water and to go to ſtool, heat, and a difficulty of urine.

Other ſymptoms, according to Aſtruc, are a tumour, pain, heat, and tenſion of the hypogaſtric region, redneſs of the os uteri, and great heat of the vagina. If the fore-part of the uterus is affected, there is a dyſury; if the back part, a teneſmus; frequent faintings and cardialgia, a burning fever; or, if the inflammation is violent, a lipyria, in which the external parts or extremities are cold, and the internal burn, and the pulſe is imperceptible; a delirium and phrenſy; the breaſts ſwell, in proportion as the inflamed uterus.

Hoffman diſtinguiſhes this diſeaſe into the ſuperficial and more profound. He ſays, that it is eaſily formed in child-bed women, and frequently accompanies the milk-fever, and may be cured in a few days if rightly managed. But that when it is more intenſe, and attended with grievous ſymptoms without remiſſion, it kills on the ſeventh, ninth, or eleventh day; a white miliary fever generally ſupervenes, which is the worſt omen, as it ſhews a mortification of the uterus. See the article MILIARY FEVER.

If the inflammation is not reſolved, it generally ends in a mortification, ulcer, cancer, or ſcirrhus.

Women in child-bed ſometimes have the womb inflamed, from the fault of an unſkilful midwife, or hard labour; or the lochia being ſtopped by pains or hyſterical ſpaſms, dread or cold: wherefore proper precautions ſhould be taken to prevent it, for which purpoſe Hoffman adviſes to keep them under a gentle diaphoretic regimen, and to allay the almoſt febrile heat; to which end oil of almonds alone is very proper, or with a fourth part of ſperma ceti given daily to half an ounce in chicken-broth: externally the whole abdomen ſhould be anointed with oil of dill, chamomile and white lilies, of each an ounce; oil of caraways, a dram; or a dram of camphire; laying a warm napkin doubled over the ſame. The tumult being thus appeaſed, the lochia are to be promoted with pills made of bitter extracts, temperate reſinous gums and aloes well corrected, of which fifteen grains is a doſe, morning and evening, to be continued from five to eight days: theſe are alſo good when the after-birth, or part of it is retained.

If there is a fever, the belly is diſtended with wind, the lochia are retained, and the ſpaſms tend to the upper parts; then the laſt-mentioned author directs the patient to be bled in the foot, and to render the ſtagnating blood fluxile by the following mixture. Take chervil-water, the carduus benedict. ſcordium, elder-flowers, acacia, and diſtilled vinegar, each an ounce and half; crabs-eyes, a dram and a half; powder of antimony, half a dram; ſpirit of nitre dulcified, twenty drops; ſyrup of card. benedict. two drams; let the patient take two or three ſpoonfuls every two hours. The drink may be chicken-broth with ſcorzonera-root, ſuccory and ſhavings of hartſhorn boiled therein.

In women out of child-bed, the inflammation generally happens in the neck of the uterus and the vagina, and then beſides the foregoing things, the ſame author recommends the application of epithems to the pubes, uterine injections, peſſaries, and ſuppoſitories: the epithem may be of arquebuſade water, four ounces; eſſence of ſaffron, camphorated ſpirit of wine, of each two ounces; nitre, a dram, diſſolved in elder flower water; and as circumſtances require, mixt with vinegar of rue, or ſcordium, and applied with a double cloth. The injection may conſiſt of aſſes-milk with flowers of elder, myrrh, and ſaffron, and a little nitre may be added to the decoction. The teneſmus may be appeaſed with emollient half baths, or with one ounce of oil of ſweet almonds, and twelve grains of ſaffron, injected into the anus. Theſe remedies are uſeful in caſe of a ſuppuration.

If it proceeds from external cauſes, and there is a fever, pain in the groin, difficulty of urine, and coſtiveneſs, bleed firſt in the arm, and then in the foot; give a clyſter, and apply melilot-plaſter, two ounces; ſperma ceti, half an ounce; gum ammoniac, two drams; ſaffron, one dram; camphire, half a dram, mixt together; not omitting gentle diaphoretics and diſcutients.

INFLAMMATORY DISEASES. To theſe may be referred the ſeveral diſeaſes mentioned in the preceding article, either attended with a fever, as well as leſſer inflammations without a fever; beſides all chronic diſorders ariſing from inflammations, the chief whereof are old coughs, conſumptions and the rheumatiſm, without a fever. See COUGH, *&c.*

Hoffman lays down this as an axiom, for all practitioners to obſerve; that in all inflammatory diſeaſes of the nervous and membranaceous parts, as in the phrenzy, pleuriſy, in the inflammation of the liver, ſtomach, inteſtines, and bladder, nothing is more pernicious, or brings on death more ſuddenly, than opiates taken inwardly.

INFLAMMATORY FEVERS are diſtinguiſhed into two ſtages; the firſt, whilſt the pulſe continues hard, in which it is proper to bleed; the ſecond, when the inflammatory ſymptoms ſtill remaining, the pulſe is too low for that evacuation; in this ſtate bliſters are the chief remedy, and which, except in a few ſingular caſes, are not to be uſed ſooner. If the bliſters are large, it is better to apply them gradually, than many at a time. See the articles FEVER and INFLAMMATION.

INFLECTION, or *Point of* INFLECTION, in the higher geometry, is the point where a curve begins to bend a contrary way. See the article FLEXURE.

To determine the point of inflection in curves, whoſe ſemi-ordinates C M, C *m* (pl. CXLVI. fig. 2 n° 1. and 2.) are drawn from the fixed point C; ſuppoſe C M to be infinitely near C *m*, and make $m\mathrm{H} = \mathrm{M}m$; let T *m* touch the curve in M. Now the angles C *m* T, C M *m*, are equal; and ſo the angle C *m* H, while the ſemi-ordinates increaſe, does decreaſe, if the curve is concave towards the center C, and increaſes if the convexity turns towards it. Whence this angle, or, which is the ſame, its meaſure will be a minimum or maximum, if the curve has a point of inflection or retrogreſſion; and ſo may be found, if the arch T H, or fluxion of it, be made equal to o, or infinity. And in order to find the arch T H, draw *m* L, ſo that the angle T *m* L be equal to *m* C L; then if $\mathrm{C}m = y$, $mr = x$, $m\mathrm{T} = \dot{t}$, we ſhall have $y : \dot{x} :: \dot{t} : \frac{tx}{y}$. Again, draw the arch H O to the radius C H; then the ſmall right lines *m r*, O H, are parallel; and ſo the triangles O L H, *m* L *r*, are ſimilar; but becauſe H I is alſo perpendicular to *m* L, the triangles L H I, *m* L *r*, are alſo ſimilar: whence $\dot{t} : \dot{x} :: y : \frac{\dot{x}\ddot{y}}{\dot{t}}$; that is, the quantities *m* T, *m* L, are equal. But H L is the fluxion of H *r*, which is the diſtance of $\mathrm{C}m = y$; and H L is a negative quantity, becauſe while the ordinate C M increaſes, their difference *r* H decreaſes; whence $\dot{x}x + \dot{y}y - \dot{y}\dot{y} = 0$, which is a general equation for finding the point of inflection, or retrogradation.

INFLECTION, in grammar, the variation of nouns and verbs, by declenſion and conjugation. See the articles DECLENSION and CONJUGATION.

INFLEX LEAF, among botaniſts, one whoſe point bends inward, towards the ſtem of the plant. See the article LEAF.

INFLUENCE, a quality ſuppoſed to flow from the heavenly bodies, either with thei light or heat; to which aſtrologers idly aſcribe all ſublunary events.

INFLUENT FEVER, the ſame with a nervous one. See the article FEVER.

INFORCED, and INFORCEMENT. See REINFORCED and REINFORCEMENT.

IN FORMA PAUPERIS, in law. See the article FORMA.

INFORMATION, in law, is nearly the ſame in the crown-office, as what in ou other courts is called a declaration. It is ſometimes brought by the king, or hi attorney general, or the clerk of the crown-office; and at other times by a private perſon, who informs or ſues as well for the king as himſelf, upon the breach of ſome popular ſtatute, in which a penalty is given to the party that will ſue for it. It differs from an indictment, which muſt be found by the oaths of ten men at leaſt; for an information is only the allegation of the perſon that brings it. An information lies for offences at common-law, as batteries conſpiracies, nuſances, contempts, libels ſeditious words, *&c.* and in many caſe by ſtatute, on which the offender is rendered liable to a fine, or other penalty: an information alſo lies againſt the inhabitants of a town, for not repairing the highways, for going armed in affray of the peace, *&c.* and in general for any offence againſt the public good, or the principles of juſtice: but where an information brought is only for vexation, th defen defendant may bring an information againſt ſuch vexatious informer. All informations brought by informers on penal ſtatutes, where a certain ſum is allowed him, muſt be brought in the county where the offence was committed, and within a year after the fact was done; but a party aggrieved, not being a common informer, is not obliged to bring his information in the proper county; for he may lay in what county he pleaſes. If an informer, without leave of the court, compounds with the defendant, he forfeits 10 l. and may be ſet in the pillory. Where an information is exhibited for treſpaſs, battery, &c. to which the defendant appears and pleads to iſſue, and the proſecutor does not bring on the trial within a year after the iſſue joined; or if a verdict paſs for the defendant, the court is to allow the defendant coſts, unleſs it appears that there was reaſonable cauſe for the information. 4 & 5 Will & Mar. cap. xviii. After a plea is put in to an information for any offence, the defendant may be ſo far indulged by the court, as to appear by his attorney. A replication to an information on a ſpecial plea in the courts of Weſtminſter, muſt be made by the attorney-general; but if it be before the juſtices of aſſize, it muſt be made by the clerk of aſſize: yet the replication to a general iſſue on an information qui tam (that is, at the ſuit both of the king and the party) in the courts of Weſtminſter, may be made in the name of the attorney-general only; and in ſuch actions, moſt of the precedents are for the replication to be made by the plaintiff, and a demurer may be made to an information qui tam, without the attorney-general.

INFORMER, a perſon that informs againſt or proſecutes another, upon any penal ſtatute. See the preceding article.

INFORMATUS NON SUM, in law. See the article NON SUM INFORMATUS.

INFORMIS, ſomething irregular in its form, or figure. See the article FIGURE and FORM.

Hence, ſtellæ informes, in aſtronomy, are ſuch of the fixed ſtars as are not reduced into any conſtellation. See the articles CONSTELLATION and STAR.

INFRACTION, a term chiefly uſed to ſignify the violation of a treaty. See the article TREATY.

INFRALAPSARIANS, in church-hiſtory, an appellation given to ſuch predeſtinarians, as think the decrees of God, in regard to the ſalvation and damnation of mankind, were formed in conſequence of Adam's fall. See PREDESTINATION.

INFRASCAPULARIS, in anatomy, one of the depreſſor-muſcles of the arm, which has its origin from the whole internal ſurface of the ſcapula, and its termination in the interior part of the humerus. See the article DEPRESSOR.

INFRASPINATUS, in anatomy, one of the abductor muſcles of the arm, which has its origin in the cavity below the ſpine of the ſcapula. See ABDUCTOR.

INFULA, in antiquity, a broad kind of fillet, made of white wool, which the prieſts uſed to tie round their heads. Hence Virgil, Æn. x. 538.

Infula cui ſacra redimibat tempora vitta.

INFUNDIBULIFORM, in botany, an appellation given to ſuch monopetalous or one-leaved flowers, as reſemble a funnel in ſhape, or which have a narrow tube at one end, and gradually widen towards the limb or mouth. There are two kinds of infundibuliform, or funnel-faſhioned flowers; one of which is like an inverted hollow cone, and the other ſomewhat like a ſaucer, and thence called hypocrateriform. See the article FLOWER.

INFUSION, in pharmacy, a method of obtaining the virtues of plants, roots, &c. by ſteeping them in a hot or cold liquid.

Hot infuſions are made by pouring boiling water, or any other menſtruum, on the drugs whoſe virtues we would extract: thus, in order to obtain the common infuſion of ſena, take the leaves of ſena, an ounce and a half; of cryſtals of tartar, three drams; of the leſſer cardamom-ſeeds huſked, two drams: boil the cryſtals of tartar in a pint of water till they are diſſolved, then pour the water, while boiling hot, upon the ſena and the reſt; and when the liquor is cold, ſtrain it off.

But all tinctures and infuſions of ingredients, whoſe principal virtues depend upon their lighter or more ſubtile and ſpirituous parts ſhould not be made by ſteeping them in a hot, but in a cold menſtruum; and if ſuch infuſions be required rich and ſtrong, they are to be made ſo, not by ſuffering the menſtruum to be heated, or to remain long upon the ingredients, but by adding freſh ingredients ſeveral times to the ſame liquor, infuſing them quick, and each time keeping out the ingredients that have been once uſed: by this means we ſhall procure the full virtues of ſimples, unaltered in their nature, yet exalted or concentrated to ſuch a degree, that a few ſpoonfuls of the liquor ſhall contain the ſpirit or quinteſſence of a pound of the plant. This is an effect not to be expected from fire, which almoſt conſtantly alters the nature of things committed to it; nor could a valuable eſſence of violets, jaſmin, lilies, borage-flowers, or any flower or plant of an extremely fine odoriferous ſpirit, be procured by heat, as it readily may by ſteeping theſe flowers in cold water, cold vinegar, cold wine, and the like; and frequently pouring the tincture upon freſh flowers, till the liquor becomes ſtrongly impregnated.

INGANNO, in muſic, is when having done every thing proper for ending a cadence, a mark of ſilence is placed inſtead of the final, which the ear naturally expects, and is deceived. See CADENCE.

INGELSHEIM, a town of Germany, in the palatinate of the Rhine, eight miles ſouth-weſt of Mentz: eaſt longitude 7° 40′, and north latitude 50°.

INGENUITAS REGNI, antiently ſignified the commonalty of the realm; and it is ſaid, that this title was likewiſe given to the barons and lords of the king's council.

INGENUOUS, *ingenuus*, in roman antiquity, an appellation given to perſons born of free parents, who had never been ſlaves: for the children of the liberti, or perſons who had obtained their liberty, were called libertini, not ingenui; this appellation of ingenuous being reſerved for their children, or the third generation.

INGINEER, or ENGINEER. See the articles ENGINEER and GUNNERY.

INGLUVIES, the crop or craw of graniverous birds, ſerving for the immediate reception of the food, where it is macerated for ſome time, before it is tranſmitted to the true ſtomach.

INGOLSTAT, a town of Germany, in the circle of Bavaria, ſituated on the river Danube, thirty miles weſt of Ratiſbon: eaſt long. 11° 30′, and north lat. 48° 45′.

INGOT, a maſs of gold or ſilver, melted down and caſt in a mould, but not coined or wrought. See the articles GOLD and SILVER.

INGRAFTING, or GRAFTING, in gardening. See the article GRAFTING.

INGRAILED, or ENGRAILED, in heraldry. See the article ENGRAILED.

INGRAVING, or ENGRAVING. See the article ENGRAVING.

INGREDIENTS, in pharmacy, whatever ſimple medicines enter the compoſition of a compound one.

INGRESS, in aſtronomy, ſignifies the ſun's entering the firſt ſcruple of one of the four cardinal ſigns, eſpecially aries.

INGRESS, EGRESS, and REGRESS, in law, words frequently uſed in leaſes of lands, which ſignify a free entry into, a going out of, and returning from ſome part of the premiſes leaſed to another.

INGRESSU, in law, a writ of entry, termed alſo a præcipe quod reddat. See the articles ENTRY and PRECIPE.

INGRIA, a province of Ruſſia, bounded by the lake Ladoga, the river Nieva, and the gulph of Finland on the north, by Novogorod on the eaſt and ſouth, and by Livonia on the weſt.

INGROSSER, one who buys up great quantities of any commodity, before it comes to market, in order to raiſe the price.

If a perſon gets into his hands, otherwiſe than upon a demiſe or grant of lands, any corn growing, butter, cheeſe, fiſh, or other victuals, within the kingdom, with intent to ſell the ſame again at a high price, he ſhall be deemed an unlawful ingroſſer. But the buying of corn to be ground into meal, or for making of ſtarch, in order to ſell it again; or barley and oats to make malt and oatmeal, are not included in this ſtatute. Foreign corn and victuals, except fiſh, are alſo exempted; as are licenced badgers, fiſhmongers, butchers, poulterers, *&c.* that buy in their own ways of dealing, and are not guilty of foreſtalling, or ſelling the ſame again at unreaſonable prices by retail. A merchant who imports victuals or merchandize into this kingdom, may diſpoſe of the ſame in groſs; yet the perſon who purchaſes them of him, may not do ſo, ſince by that means the price would be enhanced. If this was allowed, a monied man might ingroſs into his hands a whole commodity, with an intent to ſell it again at what price he thought proper: but the ingroſſing the whole of any commodity is indictable, and the offender, whether he ſell any part of them or not, is ſubject both to a penalty and to corporal puniſhment, by common law.

INGROSSER alſo ſignifies a clerk or perſon who copies records, deeds, or other inſtruments of law, on ſkins of parchment.

INGROSSING *of a fine*, is the chirographer's making the indentures of a fine, and alſo the delivery of it to him on whom it is levied. See the article CHIROGRAPHER.

INGUEN, in anatomy, the ſame with what is otherwiſe called groin, or pubes. See the article PUBES.

INGUINAL, in anatomy, *&c.* any thing belonging to the groin. Hence,

INGUINAL HERNIA is a hernia in that part called by ſurgeons bubonocele. See the article BUBONOCELE.

INHARMONICAL RELATION, in muſic, is much the ſame with diſcord. See the articles DISCORD and RELATION.

INHERENCE, in philoſophy, a term ſometimes uſed to denote the connection of an accident with its ſubſtratum, or ſubſtance. See the articles ACCIDENT and SUBSTANCE.

INHERITANCE, a perpetual right or intereſt in lands, inveſted in a perſon and his heirs.

The term inheritance is uſed, not only where a perſon has lands or tenements by deſcent; but where he becomes ſeized in fee-ſimple, or fee-tail, by purchaſe. The inheritances mentioned in our law are either corporeal or incorporeal: the corporeal relate to lands, tenements, *&c.* that may be touched or handled; and the incorporeal, to ſuch rights as are annexed to corporeal inheritances, as advowſons, tithes, annuities, offices, *&c.* There is likewiſe another inheritance, which is termed ſeveral, that is, where two or more hold lands or tenements ſeverally; as when two perſons hold to them and the heirs of their two bodies; in which caſe theſe two have a joint eſtate during their lives, but their heirs have ſeveral inheritances.

According to the law of inheritances, the firſt child is always preferred, and the male before the female; and he that has the whole blood, before another that has only a part of the blood of his anceſtor.

As to goods and chattels, they cannot be turned into an inheritance.

INHIBITION, a writ to forbid a judge's proceeding in a cauſe that lies before him. This writ generally iſſues out of an higher court-chriſtian to an inferior, and is of much the ſame nature as a prohibition. See the article PROHIBITION.

INHUMATION, in chemiſtry, a method of digeſting ſubſtances by burying the veſſel, in which they are contained, in horſe-dung or earth. See the article DIGESTION.

INJECTION, in ſurgery, the forcibly throwing certain liquid medicines into the body, by means of a ſyringe, tube, clyſter-pipe, or the like.

Many diſorders are very difficultly, if at all curable, unleſs ſome proper liquor be injected into the parts affected; which is performed by drawing the liquor into the ſyringe, and forcing it out again into the diſordered parts. In doing this, one caution is extremely neceſſary, *viz.* to apply the inſtrument very carefully, and to be mindful that the liquor you inject be not too hot or cold.

As for injections in the gonorrhœa, diſorders of the uterus, *&c.* See the articles GONORRHOEA, FLUOR ALBUS, SYRINGE, *&c.*

Surgeons alſo deſcribe the manner of injecting liquors into the veins of living men, or other animals. A vein being opened, uſually in the arm, as in bleeding, the ſmall pipe of the ſyringe is introduced, and the liquor is injected or forced into the vein upwards, towards the heart; which being done, the orifice is to be dreſſed in the ſame manner as after bleeding.

Though this practice is at preſent diſuſed, on account of the bad conſequences attending it; yet the injection of proper medicines in apoplexies, quinzies, the hydrophobia, *&c.* wherein no medicine at all can be taken by the mouth, deſerves to be tried.

Anatomical INJECTION, the filling the veſſels with ſome coloured ſubſtance, in order to make their figures and ramifications viſible.

For this purpoſe, a fine red injection is prepared thus: pour a pint of oil of turpentine on three ounces of vermilion, ſtir them well together, and then ſtrain all through a fine linen-cloth. If a green injection is wanted, diſtilled verdigreaſe may be uſed inſtead of the vermilion.

A coarſe injection may be made of one pound of tallow, five ounces of white-wax, three ounces of oil of olives, melted together, and adding two ounces of venice turpentine; and when this is diſſolved, three ounces of vermilion or verdigreaſe, are to be thoroughly mixed with the other ingredients, and the whole ſtrained through a linen-cloth.

For the manner of preparing bodies to be injected, ſee the article PREPARATION.

INITIATED, in antiquity, a term chiefly uſed in ſpeaking of perſons who were admitted to a participation of the ſacred myſteries among the heathens. See the article MYSTERY.

INJUNCTION, in law, is a writ or kind of prohibition granted in ſeveral caſes; and for the moſt part grounded on an interlocutory order or decree, made in the court of chancery or exchequer, for ſtaying proceedings either in courts of law, or eccleſiaſtical courts. An injunction is obtained either for not appearing and putting in an anſwer in due time, upon equity confeſſed, or upon matter that appears on record. If it be for ſtaying ſuits in other courts, it is grantable on ſuggeſtion of ſome matter, by which the plaintiff is rendered incapable of making his defence there, either for want of witneſſes, from his being ſued at law for what in equity he ought not to pay, or becauſe the court, in which he is ſued at law, acts erroneouſly, or denies him the benefit of the law, &c. Sometimes it iſſues on the defendant's non-appearance, to give a complainant poſſeſſion of lands, &c. and ſometimes for ſtaying waſte, in which laſt caſe an affidavit muſt be firſt made, of waſte committed in lands, &c. This writ is directed not only to the party himſelf, but to all and ſingular his counſellors, attornies, and ſolicitors; and, therefore, if any attorney, after having been ſerved with an injunction, proceeds againſt the party that obtained it, the court, out of which it iſſued, will commit him to the fleet priſon for contempt: but as an injunction ought not to be granted in a criminal caſe, ſo whenever this happens, the court of king's bench may break it, and protect thoſe that proceed in contempt of it.

INJURY, any wrong done to a man's perſon, reputation, or goods. See the articles ASSAULT, TRESPASS, &c.

INK, *atramentum*, a black liquor generally made of an infuſion of galls, copperas and a little gum arabic. See the articles GALLS, COPPERAS, &c.

To make a very good ink for writing: take three ounces of good galls, reduced to powder, which infuſe in three pints of river or rain-water, ſetting it in the ſun or a gentle heat, for two days; then take common copperas, or green vitriol, three ounces, powder it, put it into the infuſion, and ſet it in the ſun for two days more; laſtly, ſhake it well, and add an ounce of good gum arabic.

To make the London powder-ink: take ten ounces of the cleareſt nut-galls, which reduce to a fine powder; then add two ounces of white copperas, four ounces of roman vitriol, and of gum arabic or ſandarach an ounce; pound and ſift them very fine. This powder, though whitiſh itſelf, will, when put into water, turn it to a good black ink: an ounce of the powder ſerves to make a pint of ink.

To make a ſhining ink: take gum arabic and roman vitriol, of each an ounce; galls well bruiſed, a pound; put them into rape-vinegar, or vinegar made of clear ſmall beer; ſet them in a warm place, ſtir them often till the liquor becomes black, and then add to a gallon of this preparation an ounce of ivory-black, and a quarter of a pint of ſeed-lac-varniſh.

To make a ſhining japan or china ink: take an ounce of lamp-black, and clarify it in an earthen pipkin, to take out the droſs; two drams of indigo; half a dram of peach-black; one dram of black endive, burnt; reduce them to a very fine powder, and then take a moiety of fig-leaf-water, another part of milk, and a very little gum arabic, and mixing all the ingredients well together, make them up for uſe.

Printing INK is made by boiling or burning linſeed-oil till it is pretty thick, adding a little roſin to it, while hot, and then mixing this varniſh with lamp-black.

Printing-ink, on its being imported from abroad, pays 7 s. $8\frac{40}{100}$d. the hundred weight, of which 6 s. 9 d. is repaid on its exportation.

INK is alſo an appellation given to any coloured liquor, uſed in the ſame manner as the atramentum, or black ink; as red, green, blue, yellow, &c. inks.

Red ink is made thus: take wine vinegar a pint; raſpings of brazil, one ounce; alum, half an ounce; boil them gently, and add five drams of gum arabic: diſſolve the gum, ſtrain the ingredients, and keep the liquid for uſe.

Green ink is made by boiling verdigreaſe with argol, in fair water, and adding a little gum arabic.

Blue ink is made by grinding indigo with honey and the white of eggs, and making it fluid with water.

Yellow ink is made by an infuſion of ſaffron in water, with a little alum and gum arabic.

Sympathetic INK, a liquor with which a perſon may write, without the letters appearing, till ſome means be taken to render them legible.

Of this kind are the glutinous juices of plants, or any other thick and viſcid fluids, provided they have no remarkable colours themſelves; for being written on white paper, nothing will appear, till ſome fine powder of any coloured earth is thrown over the paper, whereby the letters become legible: the reaſon of this is evident, as the powder ſticks only to the letters formed by the inviſible but viſcid liquor.

Another ſort of ſympathetic inks are made of infuſions, the matter of which eaſily burn to a charcoal: thus, if a ſcruple of ſal armoniac be diſſolved in two ounces of fair water, letters written therewith will be inviſible till held before the fire; for the ſal armoniac being burnt to a charcoal, by a heat not ſtrong enough to ſcorch the paper, the letters are thereby rendered viſible.

Another ſort of ſympathetic inks are made of a ſolution of lead in vinegar, and a lixivium of lime and orpiment; for if a letter be written with the former, nothing will appear: but to conceal the affair ſtill more, ſome different ſubject may be written above it, with a black ink made of burnt cork and gum-water; then, if a piece of cotton, wetted with the ſaid lixivium, be rubbed over the paper, the ſentence that was viſible will diſappear, and the inviſible one, before written with the ſolution of lead, will be ſeen in its place very black and ſtrong.

INK FISH, *ſepia*. See the article SEPIA.

INLAGATION, the reſtoring an outlawed perſon. See OUTLAWRY.

INLAND *bills of exchange*, thoſe payable in diſtant parts of this kingdom.

If any ſuch bills be loſt, or miſcarry, within the time limited for payment, the drawer is obliged to give other bills of the ſame tenor; ſecurity being given, if demanded, in caſe the loſt bill be found again. In caſe the party on whom an inland bill of exchange ſhall be drawn, ſhall refuſe to accept the ſame, the party to whom payable ſhall cauſe ſuch bill to be proteſted for none-acceptance, as in caſe of foreign bills; for which proteſt he ſhall pay two ſhillings, and no more. See BILL, ACCEPTANCE, PROTEST, *&c.*

INLAYING, the art of marquetry. See the article MARQUETRY.

INN, a place appointed for the entertainment and relief of travellers.

Inns are licenſed and regulated by juſtices of the peace, who oblige the landlord to enter into recognizances for keeping good order. If a perſon who keeps a common inn, refuſes to receive a traveller into his houſe as a gueſt, or to find him victuals and lodging, on his tendering a reaſonable price for them, he is liable to an action of damages, and may be indicted and fined at the king's ſuit. The rates of all commodities ſold by inn-keepers, according to our antient laws, may be aſſeſſed: and inn-keepers not ſelling their hay, oats, beans, *&c.* and all manner of victuals, at reaſonable prices, without taking any thing for litter, may be fined and impriſoned, *&c.* by 21 Jac. I. cap. xxi. Where an inn-keeper harbours thieves, perſons of an infamous character, or ſuffers any diſorders in his houſe, or ſets up a new inn where there is no need of one, to the hindrance of antient and well governed inns, he is indictable and fineable; and by ſtatute, ſuch inn may be ſuppreſſed. Action upon the caſe lies againſt any inn-keeper, if a theft be committed on his gueſt, by a ſervant of the inn, or any other perſon not belonging to the gueſt; though it is otherwiſe where the gueſt is not a traveller, but one of the ſame town or village, for there the inn-keeper is not chargeable: nor is the maſter of a private tavern anſwerable for a robbery committed on his gueſt: it is ſaid, that even though the travelling gueſt does not deliver his goods, *&c.* into the inn keeper's poſſeſſion, yet if they are ſtolen, he is chargeable. An inn-keeper is not anſwerable for any thing out of his inn, but only for ſuch as are within it; yet where he, of his own accord, puts the gueſt's horſe to graſs, and the horſe is ſtolen, he is anſwerable, he not having the gueſt's orders for putting ſuch horſe to graſs. The inn-keeper may juſtify the ſtopping of the horſe, or other thing of his gueſt, for his reckoning, and may detain the ſame till it be paid. Where a perſon brings his horſe to an inn, and leaves him in the ſtable, the inn keeper may detain him till ſuch time as the owner pays for his keeping; and if the horſe eats out as much as he is worth, after a reaſonable appraiſement made, he may ſell the horſe, and pay himſelf: but when a gueſt brings ſeveral horſes to an inn, and afterwards takes them all away except one, this horſe ſo left may not be ſold for payment of the debt for the others; for every horſe is to be ſold, only to make ſatisfaction for what is due for his own meat.

INNS *of court*, are colleges in London, for the ſtudy of the laws of England, with all conveniencies for the lodging and entertainment of the profeſſors and ſtudents.

In theſe colleges, there are not only ſuch ſtudents as ſtudy the laws of this kingdom, in order to render themſelves capable of practiſing in the courts of law at Weſtminſter; but alſo ſuch other gentlemen of fortune as apply themſelves to this ſtudy, in order to know and vindicate their rights, and to render themſelves more ſerviceable to their country.

Our inns of court, which are numerous, and juſtly famed for the production of men of learning, are governed by maſters, principals, benchers, ſtewards, and other officers, and have public halls for exerciſes, readings, &c. which the ſtudents are obliged to attend and perform for a certain number of years, before they can be admitted to plead at the bar. Theſe ſocieties have not, however, any judicial authority over their members; but inſtead of this they have certain orders among themſelves, which have, by conſent, the force of laws: for lighter offences, perſons are only excommoned, or put out of commons; for greater, they loſe their chambers, and are expelled the college; and when once expelled out of one ſociety, they are never received by any of the others. The gentlemen in theſe ſocieties may be divided into benchers, outer-barriſters, inner-barriſters, and ſtudents.

The four principal inns of court are the Inner-temple, Middle-temple, Lincoln's inn, and Gray's Inn; the other inns are the two ſerjeant's inns; and the others, which are leſs conſiderable, are Clifford's inn, Symond's inn, Clement's inn, Lion's inn, Furnival's inn, Staple's inn, Thavies inn, Barnard's inn, and New-inn. Theſe are moſtly taken up by attorneys, ſollicitors, &c. but they belong to the inns of court, who ſend yearly ſome of their barriſters, to read to them.

INN-AND-INN, a game on dice, very much practiſed at an ordinary, may be played by two or three, each having a box in his hand. There are four dice, and you may drop what you pleaſe, ſixpences, ſhillings, &c. or guineas. Every inn, you drop; and every inn-and-inn, you ſweep all: likewiſe, if you throw out, if but two play, your adverſary wins all; but if three play, the ſtake may be divided between the other two, or played for.

Here you are to obſerve, that out, is when you have thrown no doublets on the four dice; inn, is when you have thrown two doublets of any ſort; and inn-and-inn, is when you throw all doublets, whether of any ſort, or otherwiſe; as four aces, &c. or two aces, &c. and two of any other denomination. The battle may be for as much or as little as you pleaſe, and is not ended till every penny of that money be won: this ſeems juſt, ſince in a battle of ten pounds, a gentleman hath been reduced to five ſhillings, and yet hath won the battle at laſt.

Like all other games, this too has its tricks; we ſhall only mention one inſtance by way of example: a gentleman who had ſpent the greater part of his patrimony, bethought himſelf how he ſhould retrieve it; and having been a conſiderable loſer by gaming, he fixed on this as the baſis of his future ſettlement; accordingly he at length contrived a box, not ſcrewed within as uſual, which, nevertheleſs, was ſo well painted as to look exactly like a ſcrewed box; it was likewiſe but half board wide at top, and, narrow at bottom, ſo that he had the dice wholly under his own management. In ſhort, with this box, and the artful placing of the dice, he won a thouſand pounds the firſt night, at the game of inn-and-inn; next night he won an eſtate of two hundred a year; on which he forſwore all gaming for the future, well knowing how many have been ruined by it.

INN, in geography, a large river which riſes in a mountain of the Alps, in the country of the Griſons, runs north-eaſt through Tyrol and Bavaria, and diſcharges itſelf into the Danube.

INN, or **INNER**, in the manege, is applied differently according as the horſe works to the right or left, upon the volt; or as he works along by a wall, a hedge, or the like: for in moving by a wall, the leg next the wall is called the outer leg, and the other the inner leg: and upon volts, if a horſe works to the right, the right heel is the inner heel, and the right leg the inner leg; but if he works to the left, the left heel is the inner heel, &c. At preſent, riding-maſters, in order to be more eaſily underſtood, generally uſe the terms right and left, inſtead of outer and inner.

NNATE IDEAS, thoſe ſuppoſed to be ſtamped on the mind, from the firſt moment of its exiſtence, and which it conſtantly brings into the world with it: a doctrine, which Mr. Locke has abundantly refuted. See the article IDEA.

NNERKEITHING, a port-town of Scotland, in the county of Fife, ſituated on the north ſhore of the frith of Forth, ten miles north-weſt of Edinburgh.

INNERLOCHY, or FORT WILLIAM, a fortreſs erected in the highlands of Scotland, at the mouth of a bay or lake in the county of Lochabar, twenty-eight miles ſouth-weſt of Lochneſs: weſt long. 5° 15′, and north lat. 56° 55′.

INNISKILLING, a ſtrong town of Ireland, in the province of Ulſter, and county of Fermanagh: weſt long. 7° 50′, and north lat. 54° 20′.

INNOCENTS-DAY, a feſtival of the chriſtian church, obſerved on December 28, in memory of the maſſacre of the innocent children by the command of Herod, king of Judea; who being alarmed at hearing that an infant was born king of the Jews, and imagining that his own kingdom was in danger, ſent orders to have all the children ſlain that were in Bethlehem, and the adjacent country.

The greek church in their calendar, and the abyſſinians of Ethiopia in their offices, commemorate fourteen thouſand infants on this occaſion.

INNOMINATA OSSA, in anatomy, three bones, which compoſe the extreme part of the trunk of a human body. Theſe, though ſingle in adults, are in infants three perfectly diſtinct bones, each of which has its peculiar name; the upper one is called the ileum; the anterior one, the os pubis, or os pectinis; and the poſterior one, the os iſchium. Theſe are joined by the intervention of a cartilage, as it were in the middle of that ſingular cavity called the acetabulum, and continue viſibly diſtinct to the age of puberty; after which they coaleſce, and form one entire bone ſo perfectly, that there is not the leaſt veſtige remaining that they ever were ſeparate.

The innominata oſſa are joined on each ſide, in the hinder part, to the os ſacrum, by ligaments and cartilages, and form a very firm and ſtrong, though ſomewhat moveable articulation with it; and with this bone they alſo form the cavity called the pelvis; they alſo cohere with the os ſacrum on each ſide, by means of two peculiar and very robuſt ligaments, each being a finger's breadth broad, and two or three finger's breadth long.

The uſe of theſe bones are to ſupport and ſuſtain the ſpina dorſi, and indeed all the parts above themſelves; to make a firm and proper juncture of the other parts of the body with the thighs; to ſerve for the place of origin to ſeveral muſcles; to form the cavity of the pelvis, and to defend its contents from external injuries.

INNOVATION, or NOVATION. See the article NOVATION.

INNUENDO, a word that was frequently uſed in declarations of ſlander, and law-pleadings, when theſe were in latin, in order to aſcertain a perſon or thing before mentioned; but now, inſtead of the word innuendo, we ſay, meaning ſo and ſo.

The practice of ſtretching innuendos, it is obſerved, has of late years, in ſome particular caſes, too much prevailed amongſt us: however, it has been held, that an innuendo cannot make that certain which was uncertain before; nor will the law allow words to be enlarged by an innuendo, ſo as to ſupport an action on the caſe for uttering them. In ſlandder, the perſon and words ſhould both of them be diſtinctly ſpecified, and not want an innuendo to make them out; and therefore an innuendo will not render an action for a libel good, where the preceding matter imports no ſcandal.

INOCULATION, in medicine, the art of tranſplanting a diſtemper from one ſubject to another, by inciſion, particularly uſed for engrafting the ſmall pox. See the article POX.

The deſign of this operation is to communicate by art a milder ſpecies of the ſmall pox to the infant or adult patient, than that received by the natural infection; and this by engrafting ſome of the variolous matter, in order to which a ſmall inciſion is to be firſt made, with a ſcalpel or lancet, through the ſkin of the arm, and having inſerted a ſmall particle of the purulent matter, taken from a mild kind of the pock, the little wound is then to be dreſſed with ſome dry lint, and covered with a plaſter. After the operation, the patient muſt conſtantly keep his chamber, the air of which ſhould be moderately warm, and his diet regulated by ſome prudent phyſician, by which means this diſorder will ſhew itſelf in ſeven or eight days, without any malignant ſymptoms, and if aſſiſted by a proper

per regimen, and a moderate wramth, it uſually runs gently through its ſeveral ſtages. When the patient has once had the diſorder this way, though ever ſo mild, it is certain from experience, that they never have it again; and therefore the opinion of thoſe ſeems to be well grounded, who think that the propagation of the ſmall pox by inoculation might be of general uſe and benefit to mankind, in preſerving the lives of ſome, and the moſt important members of others, as the face, eyes, hearing, viſcera, *&c.*

Hiſtory informs us, that the diſorder was this way propagated many hundred years ago, among the Greeks, Turks, and Chineſe, whereas it is but of late years that the european nations have come into it, among which the engliſh ſeem to have approved and followed it moſt. The experiment ſucceeded ſo well in the hands of the britiſh phyſicians, that king George I. countenanced the ſame in all his dominions, and from thence the practice prevailed with ſucceſs in Germany, particularly in the dominions of Hanover.

It muſt, however, be confeſſed, that there were many, both among the French and Engliſh, who endeavoured to ſuppreſs and vilify the practice in their writings; and indeed this practice has been lately forbid in France, and meets with leſs countenance in England than it formerly did; yet Heiſter has thought, that all the objections that have been made to this practice are ſufficiently anſwered and obviated by Dr. Jurin and other able phyſicians.

Heiſter declares himſelf of opinion, that ſo far from thinking the practice fatal or miſchievous, he rather firmly believes it might, under a proper management, be of the greateſt uſe and benefit to the lives and healths of mankind; for, as he judges, the ſmall pox ariſe from a peſtilential virus or matter lodged in the blood, from the very firſt day of the birth, which breaks out almoſt in every perſon, ſooner or later, and the more early uſually the better, as it is ſeldom we obſerve the pox favourable in thoſe more advanced in years; ſo that the matter ſeems to multiply itſelf in the blood, and augment with the patient's age. If, therefore, the diſorder be procured of a mild kind by this operation, and the blood cleared of its latent virus, while ſmall in quantity, and the infant young, he doubts not but many might by this means be not only preſerved from death, bu even conducted ſafely through the ſeveral ſtages of the diſeaſe, without the inſults of its moſt malignant ſymptoms We are convinced from experience, a well as reaſon, that, the diſorder which breaks out from a natural infection, i generally more ſevere and fatal than tha produced by art; and no wonder i ſhould be ſo, ſince in the laſt, the phyſician has the opportunity of chooſing the moſt favourable ſeaſon, and of preparing his patient before-hand, by a proper regimen, diet, and medicines.

In the Phil. Tranſ. vol. xlvii. we hav a new method of inoculation, diſcovered by Mr. Brooke, and communicated by him, in a letter, read before the Roya Society, May 14, 1752, to Dr. Parſons ſecretary to the ſociety for foreign correſpondence, ſhewing by experiments, tha the pock may be engrafted without making any inciſion, only by the application of a little lint impregnated with variolou matter, and confining it with an adheſiv plaſter. Mr. Brooke tried the experiment upon ſeveral patients, and alway with ſucceſs; the abſorbent veſſels, h believes, in young ſubjects eſpecially will always take in a ſufficient quantity of the matter to contaminate the whole maſs of the circulating fluids; and tho the denſity of the pores, or ſcaly inſpiſſations of the materia perſpirabilis, in adults, may in ſome meaſure prevent the diſorder from being communicated by contact, yet friction will eaſily remove that obſtacle; for by this means the cuticle is made as thin as is required, and the warmth induced by friction will dilute the mouths of the abſorbent veſſels, and draw a moderate flux of juices to tha part, ſo that they may take in a ſufficient quantity of variolous matter, to bring on the diſorder.

In the ſame volume of the Tranſactions we have an extract of a letter to Dr. Maty, from Geneva, read June 18, following, concerning the introduction and ſucceſs of inoculation in that city. Their firſt method of doing it was generally the ſame as is now practiſed in England, whence inſtructions were ſent to Geneva, when they began to inoculate: yet three perſons were inoculated in a new manner: theſe were bliſtered ſlightly by means of a ſmall veſicatory applied to that part of the arm where the inciſion is uſually made. The bliſter occaſioned by this plaſter was opened, and a pledgit, dipped in the pocky matter was applied to the excoriated part: ſome pocky matter was made uſe of, which was kept three weeks; and ſome that had even been kept four months, without any apparent difference in the effects from that which was freſh. The experience which they have hitherto had in Geneva, has ſuggeſted to them a conjecture, that the inciſion ought to have been made deeper, where the matter, which is uſed, has been kept ſome time. All who had been inoculated by that time at Geneva, had recovered; and the far greater part of them had but an inconſiderable number of puſtules.

Inoculation, or **Budding**, in gardening, is commonly practiſed upon all ſorts of ſtone-fruit, as nectarines, peaches, apricots, plumbs, cherries, as alſo upon oranges and jaſmines; and, indeed, this is preferable to any ſort of grafting for moſt ſorts of fruit. The method of performing it is as follows: you muſt be provided with a ſharp penknife with a flat haft, which is to raiſe the bark of the ſtock to admit the bud; and ſome ſound baſs-mat, which ſhould be ſoaked in water, to increaſe its ſtrength, and render it more pliable; then having taken off the cuttings from the trees you would propagate, you muſt chooſe a ſmooth part of the ſtock about five or ſix inches above the ſurface of the ground, if deſigned for dwarfs; but if for ſtandards, they ſhould be budded ſix feet above ground. Then with your knife make an horizontal cut acroſs the rind of the ſtock, and from the middle of that cut make a ſlit downwards, about two inches in length, ſo that it may be in the form of a T; but you muſt be careful not to cut too deep, leſt you wound the ſtock; then having cut off the leaf from the bud, leaving the foot-ſtalk remaining, you ſhould make a croſs cut, about half an inch below the eye, and with your knife ſlit off the bud, with part of the wood to it: this done, you muſt with your knife pull off that part of the wood which was taken with the bud, obſerving whether the eye of the bud be left to it or not; for all thoſe buds which loſe their eyes in ſtripping, are good for nothing: then having gently raiſed the bark of the ſtock with the flat haft of your penknife clear to the wood, thruſt the bud therein, obſerving to place it ſmooth between the rind and wood of the ſtock, cutting off any part of the rind belonging to the bud, that may be too long for the ſlit made in the ſtock; and ſo having exactly fitted the bud to the ſtock, tie them cloſely round with baſs-mat, beginning at the under part of the ſlit, and ſo proceeding to the top, taking care not to bind round the eye of the bud, which ſhould be left open.

When your buds have been inoculated three weeks or a month, thoſe which are freſh and plump, you may be ſure are joined; and at this time you ſhould looſen the bandage, which if it be not done in time, will injure if not deſtroy the bud. The March following cut off the ſtock ſloping, about three inches above the bud, and to what is left faſten the ſhoot which proceeds from the bud: but this muſt continue no longer than one year; after which the ſtock muſt be cut off cloſe above the bud. The time for inoculating is from the middle of June to the middle of Auguſt: but the moſt general rule is, when you obſerve the buds formed at the extremity of the ſame year's ſhoot, which is a ſign of their having finiſhed their ſpring growth. The firſt ſort commonly inoculated is the apricot, and the laſt the orange-tree, which ſhould never be done till the latter end of Auguſt. And in doing this work, you ſhould always make choice of cloudy weather; for if it be done in the middle of the day, when the weather is hot, the ſhoots will perſpire ſo faſt, as to leave the buds deſtitute of moiſture.

INORDINATE proportion, is where there are three magnitudes in one rank, and three others proportional to them in another, and you compare them in a different order. Thus ſuppoſe the numbers in one rank to be 2, 3, 9; and thoſe of the other rank 8, 24, 36; which are compared in a different order, *viz.* 2 : 3 : : 24 : 36; and 3 : 9 : : 8 : 24. Then rejecting the mean terms of each rank, you conclude 2 : 9 : : 8 : 36.

INOSCULATION, in anatomy, the ſame with anaſtomaſis. See Anastomasis.

INQUEST, in law, ſignifies an inquiry made by a jury, in a civil or criminal cauſe, by examining witneſſes. See the article Jury.

There is alſo an inqueſt of office, uſed for the ſatisfaction of the judges, and ſometimes to make inquiry whether a criminal be a lunatic or not; upon which inqueſt, if it be found that the criminal only feigns himſelf to be a lunatic, and at the ſame time refuſes to plead, he may be dealt with as one ſtanding mute. See the article MUTE.

Where a perſon is attainted of felony and eſcapes, and afterwards on being re-taken denies that he is the ſame man, inqueſt muſt be made into the identity of the perſon by a jury, before he can be executed.

INQUIRENDO, in law, an authority given to one or more perſons, to inquire into ſomething for the advantage of the king.

INQUISITION, in law, a manner of proceeding by way of ſearch or examination uſed on the king's behalf, in caſes of out-lawry, treaſon, felony, ſelf-murder, *&c.* to diſcover lands, goods, and the like, forfeited to the crown. Inquiſition is alſo had upon extents of lands, tenements, *&c.* writs of elegit, and where judgment being had by default, damages and coſt are recovered.

INQUISITION, in the church of Rome, a tribunal in ſeveral roman-catholic countries, erected by the popes for the examination and puniſhment of heretics.

This court was founded in the twelfth century by father Dominic and his followers, who were ſent by pope Innocent III. with orders to excite the catholic princes and people to extirpate heretics, to ſearch into their number and quality, and to tranſmit a faithful account thereof to Rome. Hence they were called inquiſitors; and this gave birth to the formidable tribunal of the inquiſition, which was received in all Italy, and the dominions of Spain except the kingdom of Naples and the Low Countries.

This diabolical tribunal takes cognizance of hereſy, judaiſm, mahometaniſm, ſodomy, and polygamy; and the people ſtand in ſo much fear of it, that parents deliver up their children, huſbands their wives, and maſters their ſervants, to its officers, without daring in the leaſt to murmur. The priſoners are kept for a long time, till they themſelves turn their own accuſers, and declare the cauſe of their impriſonment; for they are neither told their crime, nor confronted with witneſſes. As ſoon as they are impriſoned their friends go into mourning, and ſpeak of them as dead, not daring to ſolicit their pardon, leſt they ſhould be brought in as accomplices. When there is no ſhadow of proof againſt the pretended criminal, he is diſcharged, after ſuffering the moſt cruel tortures, a tedious and dreadful impriſonment, and the loſs of the greateſt part of his effects. The ſentence againſt the priſoners is pronounced publicly, and with extraordinary ſolemnity. In Portugal they erect a theatre capable of holding three thouſand perſons, in which they place a rich altar, and raiſe ſeats on each ſide in the form of an amphitheatre. There the priſoners are placed, and over-againſt them is a high chair, whither they are called, one by one, to hear their doom, from one of the inquiſitors.

Theſe unhappy people know what they are to ſuffer, by the cloaths they wear that day. Thoſe who appear in their own cloaths, are diſcharged upon payment of a fine: thoſe who have a ſanto benito, or ſtrait yellow coat without ſleeves, charged with St. Andrew's croſs, have their lives, but forfeit all their effects: thoſe who have the reſemblance of flames, made of red ſerge, ſewed upon their ſanto benito, without any croſs, are pardoned, but threatened to be burnt if ever they relapſe: but thoſe who, beſides theſe flames, have on their ſanto benito, their own picture, ſurrounded with figures of devils, are condemned to expire in the flames. The inquiſitors, who are eccleſiaſtics, do not pronounce the ſentence of death; but form and read an act, in which they ſay, that the criminal being convicted of ſuch a crime, by his own confeſſion, is with much reluctance delivered to the ſecular power to be puniſhed according to his demerits: and this writing they give to the ſeven judges, who attend at the right ſide of the altar, who immediately paſs ſentence. For the concluſion of this horrid ſcene, ſee the article ACT *of faith*.

INQUISITORS, in law, perſons who have power by their office to make inquiry in certain caſes; as ſheriffs, and coroners on view of the body, *&c.*

INROLLMENT, in law, is regiſtering any lawful act, as a ſtatute or recognizance acknowledged, a deed of bargain and ſale, *&c.* in the rolls of chancery, king's bench, common pleas, or exchequer, at the huſtings of Guildhall, London, or at the quarter-ſeſſions.

Inrollments of deeds muſt be recorded in court, and for the ſake of perpetuity ingroſſed on parchment: yet it is ſaid that inrolling a deed does not make it a record, which is an entry on parchment of judicial matters controverted in a court of record; and of which the court is to take notice: but the inrollment of a deed, is only a private act of the parties concerned, of which the court takes no notice at the time when it was done, tho' the court gives way and accedes to it. All deeds may be inrolled at common law, and tho' by accident a ſeal is broke off, it will not hinder it. A deed when inrolled muſt be acknowledged before a maſter in chancery, or a judge of the court where it is inrolled; which being the officer's warrant for its inrollment, ſuch inrollment will be allowed as good proof of the exiſtence of the deed itſelf.

Clerk of INROLLMENTS, or ENROLLMENTS. See the article CLERK *of enrollments.*

INSCONCED, in the military art, part of an army that have fortified themſelves with a ſconce or ſmall fort, in order to defend ſome paſs, &c.

INSCRIBED, in geometry. A figure is ſaid to be inſcribed in another, when all its angles touch the ſides or planes of the other figure. See the articles HEXAGON, PENTAGON, &c.

INSCRIPTION, a title or writing carved, engraved, or affixed to any thing, to give a more diſtinct knowledge of it, or to tranſmit ſome important truth to poſterity.

The inſcriptions mentioned by Herodotus and Diodorus Siculus, ſufficiently ſhew that this was the firſt method of conveying inſtruction to mankind, and tranſmitting the knowledge of hiſtory and ſciences to poſterity: thus the antients engraved upon pillars both the principles of ſciences, and the hiſtory of the world. Piſiſtratus carved precepts of huſbandry on pillars of ſtone; and the treaties of confederacy between the Romans and Jews, were engraved on plates of braſs. Hence, antiquarians have been very curious in examining the inſcriptions on ancient ruins, coins, medals, &c.

INSECTS, in zoology, a numerous claſs of animals, whoſe bodies are neither regularly covered with hair, feathers, or ſcales, as in the generality of other animals; but either with a hard, and as it were horny ſubſtance, or with a ſoft and tender ſkin; and of which the far greater part, that is, all the inſects with a hard covering to their bodies, have on their heads antennæ, otherwiſe called horns and feelers.

The moſt general ſub-diviſion of inſects is into two ſeries, *viz.* the winged and naked ones; each of which comprehends ſeveral ſubordinate orders of genera, each containing numerous ſpecies.

The ſeveral orders of the firſt-ſeries are the coleoptera, hemiptera, neuroptera, lepidoptera, hymenoptera, and diptera; and thoſe of the ſecond ſeries, are the aptera, reptilia, zoophyta, teſtacea, and lithophyta: of all which we have treated under their reſpective articles. See the articles COLEOPTERA, NEUROPTERA, &c.

Generation of INSECTS. See the article GENERATION.

INSERTION, in anatomy, the cloſe conjunction of the veſſels, tendons, fibres, and membranes of the body with ſome other parts. See the articles TENDONS, MUSCLE, &c.

INSIDIANT DISEASES, thoſe which ſhew no evident ſymptom, but lie concealed in the body, ready to break forth on the leaſt provocation, as it were by ſurprize.

INSINUATION, in our law, a clandeſtine creeping into a perſon's mind, or favour; but, among the civilians, it bears a different ſignification; as the inſinuation of a will is the firſt production of it, *viz.* the leaving it in the hands of the regiſter, in order to the procuring a probate thereof.

INSIPID, an appellation given to things without taſte. See the article TASTE.

INSITION, in gardening, the ſame with grafting. See the article GRAFTING.

INSOLATION, in chemiſtry, the ſuffering matters to ſtand and digeſt in the heat of the ſun, inſtead of that of a furnace. See FIRE and HEAT.

INSOLVENT, a term applied to perſons unable to pay their debts. See the articles DEBT and DEBTOR.

INSPIRATION, among divines, implies the conveying of certain extraordinary and ſupernatural notices or motions into the ſoul.

In diſcourſing upon the argument concerning the inſpiration of the ſcripture, the learned Du Pin alledges the teſtimony of the Jews, the authority of our Saviour and his apoſtles, and the univerſal conſent of the chriſtian church.

1. It cannot be in the leaſt doubted, but that the antient Jews were thoroughly perſuaded that the books in their canon were written by prophets divinely inſpired: they looked upon the law of Moſes as the law of God himſelf, and on the pentateuch as the foundation of their religion: they had even the evidence

of their ſenſes, that Moſes was ſent by God, that he converſed familiarly with him, and was aſſiſted by him in an extraordinary manner; witneſs the many miracles which God wrought by him, and his divine providence and protection being vouchſafed to him in an unuſual manner; ſo that, upon the whole, they had all imaginable evidence that the laws and hiſtorical narrations of Moſes were all of them penned by inſpiration from heaven. As to the other canonical books collected by Ezra, it cannot be queſtioned with any colour of reaſon, but that Ezra, in drawing up his canon and ſacred books, made choice of thoſe which had the character of divinely inſpired writings, and had been always acknowledged as ſuch by the univerſal conſent of the jewiſh nation; and the ſynagogue looked upon this canonical ſyſtem as prophetical and divinely inſpired. See CANON and BIBLE.

2. From the unexceptionable teſtimony of the Jews, M. Du Pin proceeds to alledge the authority of our Saviour and his apoſtles. It is upon the evidence of theſe books that our Saviour proves himſelf to be the meſſias, and by them that he confutes the Jews. The apoſtles followed their maſter's doctrine in this as well as in all other things: theſe books they made uſe of to authoriſe the goſpel they preached, and to prove that the prophecies concerning the meſſias, were fulfilled in the perſon of Jeſus Chriſt.

3. From theſe authorities he proceeds to the teſtimony of the primitive church: thoſe who were inſtructed by our Saviour and his apoſtles, had not only the ſame regard for the books of the Old Teſtament as the Jews themſelves had, but likewiſe by univerſal conſent received the goſpels and epiſtles of the apoſtles as writings penned by the inſpiration of the holy ghoſt. The primitive chriſtians being fully perſuaded of this truth, received the apoſtles doctrine with intire ſubmiſſion, and looked upon it as no other than the inſtruction of Jeſus Chriſt and of God himſelf. See the article CHRISTIAN RELIGION.

INSPISSATING, in pharmacy, an operation whereby a liquor is brought to a thicker conſiſtence, by evaporating the thicker parts. See INCRASSATING.

INSPRUCK, a city of Germany, in the circle of Auſtria, capital of the county of Tyrol, ſituated on the river Inn, in eaſt long. 11° 26′, north lat. 47° 12′.

INSTALLMENT, the inſtating or eſtabliſhing a perſon in ſome dignity.

This word is chiefly uſed for the induction of a dean, prebendary, or other eccleſiaſtical dignitary, into the poſſeſſion of his ſtall, or other proper ſeat in the cathedral to which he belongs. It is alſo uſed for the ceremony whereby the knights of the garter are placed in their rank, in the chapel of St. George at Windſor, and on many other like occaſions. It is ſometimes termed inſtallation. See GARTER.

INSTANT, ſuch a part of duration wherein we perceive no ſucceſſion; or it is that which takes up the time only of one idea in our minds.

The ſchoolmen diſtinguiſh three kinds of inſtants; a temporary, a natural, and a rational inſtant.

Temporary inſtant is a part of time immediately preceding another: thus the laſt inſtant of a day precedes, immediately and really, the firſt inſtant of the following day.

Natural inſtant is what we otherwiſe call a priority of nature, which obtains in things that are ſubordinated in acting, as firſt and ſecond cauſes, or cauſes and their effects: for the nature of things requires, that if there be a ſecond cauſe there muſt be a firſt; and that there muſt be a cauſe, if there be an effect. See the article CAUSE.

Rational inſtant is not any real inſtant, but a point which the underſtanding conceives to have been before ſome other inſtant, founded on the nature of the thing which occaſioned it to be conceived: for inſtance, if God made ſeveral things voluntarily, which he could otherwiſe have let alone, there is a reaſonable foundation to conceive God ſuch as he is in himſelf, before he had made any of theſe voluntary determinations: but as there was no real inſtant when God had not formed any determination, this inſtant is called a rational inſtant, by way of oppoſition to an inſtant of time.

INSTAURATION, the re-eſtabliſhment or reſtauration of a religion, a church, or the like, to its former ſtate.

INSTEP, in the manege, is that part of a horſe's hind leg which reaches from the ham to the paſtern-joint; and which, when the horſe is in his natural poſture of ſtanding, ſhould be large, flat, and in a perpendicular line with the ground: for when the inſteps do not ſtand perpendicularly, it is a certain ſign of weakneſs either in the reins or hinder quarters.

INSTINCT, an appellation given to the ſagacity and natural inclinations of brutes, which ſupplies the place of reaſon in mankind. See REASON and BRUTE.

INSTITUTES, in literary hiſtory, a book containing the elements of the roman law, and conſtitutes the laſt part of the civil-law. See CIVIL-LAW.

The inſtitutes are divided into four books, and contain an abridgment of the whole body of the civil-law; being deſigned for the uſe of ſtudents.

INSTITUTION, in general, ſignifies the eſtabliſhing or founding ſomething.

In the canon and common law, it ſignifies the inveſting a clerk with the ſpiritualities of a rectory, *&c.* which is done by the biſhop, who uſes the formula, "I inſtitute you rector of ſuch a church, "with cure of ſouls, and receive your "care and mine." This makes him a complete parſon as to ſpirituality, but not as to temporality, which depends on induction. See the article INDUCTION.

The term inſtitutions is alſo uſed, in a literary ſenſe, for a book containing the elements of any art or ſcience: ſuch are inſtitutions of medicine, inſtitutions of rhetoric, *&c.*

INSTRUCTIVE COLUMN, in architecture. See the article COLUMN.

INSTRUMENT, in general, whatever is ſubſervient to a cauſe in producing any effect. See CAUSE and EFFECT.

A common caſe of mathematical inſtruments contains ſeveral compaſſes, a ſector, ſcale, drawing-pen, and protractor. See the articles COMPASSES, SECTOR, SCALE, *&c.*

A caſe of pocket inſtruments for ſurgeons, which they ought always to carry about with them, contains lancets of different ſizes; ſciſſars, fit for ſeveral uſes; forceps, plain and furniſhed with teeth; inciſion-knives, ſtraight and crooked; a ſpatula, probes, needles, *&c.* See LANCET, SCISSARS, FORCEPS, *&c.*

The following inſtruments uſed by ſurgeons, pay on their importation according to theſe rates. Trepans, the dozen pay 1 s. $11\frac{10}{100}$d. and draw back on exportation, 1 s. $8\frac{25}{100}$d. Bullet-ſkrews, the dozen, pay $9\frac{24}{100}$d. and draw back $8\frac{10}{100}$d. Inciſion-ſheers, paiçes, or tooth drawers and pluſicanes, the dozen pay $11\frac{55}{100}$d. and draw back $10\frac{12\frac{1}{2}}{100}$d. Setts, the bundle, containing ſixteen, pay $4\frac{62}{100}$d. and draw back $4\frac{5}{100}$d. More if made of iron, for every 112 pounds, 4 s. $8\frac{25}{100}$d. and draw back 4 s. $8\frac{25}{100}$d. if made of ſteel, the 112 pounds pay 5 s. $1\frac{87\frac{1}{2}}{100}$d. the whole of which is returned on exportation: but if they are made of ſilver, they are to pay as plate. See PLATE.

INSTRUMENT, in law, ſome public act, or authentic deed, by which any truth is made apparent, or any right or title eſtabliſhed in a court of juſtice. See DEED.

INSTRUMENTS, in muſic, are either played on by means of wind, as the organ, flute, hautboy, *&c.* or of ſtrings, as the harpſichord, violin, *&c.* See the articles ORGAN, FLUTE, HARPSICHORD, *&c.*

INSULATED, *inſulatus*, in architecture, an appellation given to ſuch columns as ſtand alone; or free from any contiguous wall, *&c.* like an iſland in the ſea; whence the name. See COLUMN.

INSULT, *inſultus*, in medicine, ſignifies the acceſs of the paroxyſm of intermitting diſeaſes. See the articles INTERMITTENT and PAROXYSM.

INSULT, in the art of war, the ſame with aſſault. See the article ASSAULT.

INSUPER, over and above, a term uſed by the auditors of the exchequer in their accounts; thus, where a certain ſum is charged to a perſon's account, they ſay, ſo much remains, inſuper, to the accountant.

INSURANCE, or ASSURANCE, in law and commerce, a contract or agreement whereby one or more perſons, called inſurers, aſſurers, *&c.* oblige themſelves to anſwer for the loſs of a ſhip, houſe, goods, *&c.* in conſideration of a premium paid by the proprietors of the things inſured.

Inſurances are of various kinds, as on ſhips or parts of ſhips, on merchandize ſingly, and on ſhips and goods jointly: and theſe are again branched out to run either for a time ſtipulated, or to one ſingle port, or out and home, with liberty to touch at the different places mentioned in the policy. Inſurances may likewiſe be made on goods ſent by land, or by hoys, *&c.* on rivers; and this is frequently done, more eſpecially on jewels, and other things of great value. They may likewiſe be made on ſhips and goods, loſt or not loſt, which is commonly done when a ſhip has been long miſſing; and thoſe words being inſerted in the policy, oblige the under-writers to pay, though the ſhip was loſt at the time of making ſuch inſurance, except the aſſured had then certain knowledge of the ſhip's being wrecked; in which caſe the ſubſcription ſhall not oblige, as this is accounted a mere fraud. So likewiſe if a perſon get more inſured than the ſhip is worth, with a villainous deſign to deſtroy her, this fraudulent act will not oblige the inſurers, but expoſe the proprietors to ſuffer death for their knavery. If a ſhip is inſured from the port of London to any foreign port, and before ſhe breaks ground is burnt, the inſurers are not liable; unleſs the words of the inſurance are, at and from the port of London; but if ſhe has once broke ground, and after being driven back, takes fire, the inſurers are anſwerable. An inſurance made on prohibited goods is not binding, unleſs they were not prohibited till after the inſurance was made. Where the policy expreſsly mentions that the ſhip is to depart with convoy, it is intended that ſhe ſhall, if poſſible, keep with the convoy during the voyage, and if ſhe depart wilfully from the convoy, it is a fraud; but if having departed with convoy, ſhe by ſtreſs of weather loſes the convoy, and is taken, the inſurers are liable. If there be thieves on board among themſelves, the maſter of the ſhip is to anſwer for that, and not the inſurers; for tho' the words of the policy inſure againſt loſſes by thieves, yet aſſailing thieves are only here intended. An inſurance made in a foreign country, may be ſued in England by the common law, if the inſurers come here. Where the policy is againſt reſtraint of princes, that does not extend to a navigation carried on againſt the law of nations, or where there ſhall be a ſeizure for not paying of cuſtoms, or the like. If goods be inſured as the goods of an ally, when they are the goods of an enemy, it is a fraud, and the inſurance not good. If a man pays money on a policy of inſurance, ſuppoſing a loſs where there was none, this ſhall be money received for the uſe of the inſurer, for which he may maintain an action. Damages happening to goods in their own nature periſhable, are not to be borne by the inſurer. A ſuppreſſion of the truth, or a falſe allegation, is ſufficient to diſcharge the policy; for it is a general rule, that the inſured ought to inform the inſurer of all material circumſtances that were come to his knowledge, at the time of making the policy, in order that the contract may be fairly adjuſted; which being a contract upon chance, cannot be done, if one party knows more than the other; for equality in contracts, by the law-merchant, is eſſential; but a proof of an intention to make a deviation, will not avoid the policy before the deviation is actually made.

By an act made in 19 Geo. II. it is determined, that after the firſt day of Auguſt, 1746, no aſſurance ſhall be made on ſhips or lading by way of gaming or wagering, or without benefit of ſalvage to the inſurer: that it ſhall not be lawful to make re-aſſurance, unleſs the aſſurer ſhall become inſolvent, become a bankrupt, or die; in which caſes ſuch aſſurer, or his executors, *&c.* may make re-aſſurance to the amount of the ſum before aſſured, provided it be expreſſed in the policy to be a re-aſſurance. That all ſums of money lent on bottomry or at reſpondentia, upon any ſhips belonging to his majeſty's ſubjects, bound to or from the Eaſt-Indies, ſhall be lent only on the ſhip or merchandize, laden, or to be laden, on board ſuch ſhip, and ſhall be ſo expreſſed in the condition of the bond; and the benefit of ſalvage ſhall be allowed to the lender, his agents or aſſigns, who alone ſhall have a right to make aſſurance on the money ſo lent; and no borrower of money on bottomry, *&c.* ſhall recover more on any aſſurance, than the value of his intereſt in the ſhip or merchandize, excluſively of the money ſo borrowed; and in caſe it ſhall appear, that the value of his ſhare in the ſhip or merchandize does not amount to the full ſum borrowed, ſuch borrower ſhall be reſponſible to the lender for ſo much of the money borrowed, as he hath not laid out on the ſhip or merchandize, with lawful intereſt for the ſame, together with the inſurance and all other charges, to the proportion which the money not laid out ſhall bear to the whole money lent, notwithſtanding the ſhip and merchandize be totally loſt.

Whenever advice is received of the loſs of a ſhip or goods inſured, application is to be made to the inſurers, and the vouchers produced; and if they are ſatisfied they will pay the money; but if they have cauſe to ſcruple the doing it, the inſured muſt ſtay till the inſurers can obtain a more ſatisfactory account; but if nothing be heard of the ſhip in any reaſonable time, the inſurers will be obliged to pay the money agreed upon.

The policies made of inſurances are to be ſtamped within three days after the ſhip is inſured, on the penalty of paying 100 l.

The principal offices for the inſurance of ſhips and merchandize in London, are the Royal-exchange aſſurance, and the London-aſſurance, both of which are eſtabliſhed by act of parliament. Theſe offices alſo inſure houſes and other buildings, goods, wares, and merchandize, from loſs or damage by fire; and the former of them alſo aſſure lives.

The Royal-exchange inſurance, on a brick or ſtone building, inſures any ſum not exceeding 200 l. at 5 s. *per ann.* and any larger ſum not exceeding 1000 l. after the rate of 2 s. 6 d. *per cent. per ann.* Above 1000 l. and not exceeding 2000 l. at 3 s. *per cent.* Above 2000 l. and not exceeding 3000 l. at 4 s. *per cent.* On goods and merchandize, the property of the aſſured, within any brick or ſtone building, or on the goods and building together, this office inſures any ſum not exceeding 300 l. for 7 s. 6 d. *per ann.* and larger ſums after the rates above-mentioned: but timber or plaſter-buildings, or goods or merchandize therein, pay 8 s. *per ann.* for 200 l. and after the rate of 4 s. *per cent.* for any greater ſum not exceeding 1000 l. and 5 s. *per cent.* for all inſurances above 1000 l. and not exceeding 2000 l. On a timber or plaſter building with goods and merchandize together, any ſum not exceeding 300 l. may be inſured for 12 s. *per ann.* and larger ſums at the above rates. The goods belonging to hazardous trades, as diſtillers, chemiſts, apothecaries, colourmen, tallow-chandlers, oilmen, innholders, *&c.* depoſited in brick houſes, pay 8 s. *per ann.* for inſuring 200 l. and after the rate of 4 s. *per cent.* for any greater ſum not exceeding 1000 l; and above 1000 l. and not exceeding 2000 l. 5 s. *per cent.* but when the houſes and goods are put together, the price of inſurance is 4 s. *per cent. per ann.* without any other charge except the policies.

The London inſurance has the following annual premiums.

Sums aſſured.	Common inſurances.		Hazardous inſurances.		Double hazardous inſurances.	
Any ſum						
Not exceeding 200 l.	4 s. per annum.		6 s. per annum.		10 s. per annum.	
From 200 l. to 1000 l.	2 s. per cent.	per an.	3 s. per cent.	per an.	5 s. per cent.	per an.
From 1000 l. to 2000 l.	2 s. 6 d. per ct.		4 s. per cent.		7 s. 6 d. per ct.	
From 2000 l. to 3000 l.	4 s. per cent.		6 s. per cent.		7 s. 6 d. per ct.	

The hand-in-hand office inſure for ſeven years at 12 s. per cent. on brick, and double that ſum for timber-houſes.

The ſun-fire office, beſides 7 s. 6 d. for the policy and mark, has the following annual premiums.

Sums inſured.	Common inſurances.		Hazardous inſurances.		Double hazardous inſurances.	
Any ſum						
Not exceeding 200 l.	4 s. per annum.		6 s. per annum.		10 s. per annum.	
From 200 l. to 1000 l.	2 s. per cent.	per an.	3 s. per cent.	per an.	5 s. per cent.	per an.
From 1000 l. to 2000 l.	2 s. 6 d. per ct.		4 s. per cent.		7 s. 6 d. per ct.	
From 2000 l. to 3000 l.	3 s. 6 d. per ct.		5 s. per cent.		7 s. 6 d. per ct.	

The friendly ſociety inſurance, has ſome very extraordinary regulations, the principal of which is, that every one of the aſſured becomes a member of the ſociety; and when any loſs happens, contributes in proportion to the ſum he has inſured, to make good the damage; on which account he pays only 1 s. 4 d. *per cent. per ann.* premium, and 6 s. 8 d. *per cent.* as a caution; but what is unexpended of the 6 s. 8 d. is returned to the party inſured at the end of ſeven years.

We have alſo inſurances for lives, in virtue of which, when the perſon inſured dies, a ſum of money becomes payable to the perſon on whoſe behalf the policy of inſurance was granted. The principal inſurance office of this kind, is that of the amicable ſociety for a perpetual aſſurance, kept in Serjeant's inn, Fleet-ſtreet, London.

In this office, after paying the charges of the policy, and 10 s. entrance-money, each perſon pays 5 l. *per annum*, by quarterly payments, and from theſe payments, the dividends, which uſually amount to 100 l. and upwards, are to ariſe. All perſons admitted are to be between the ages of twelve and forty-five, and in a good ſtate of health. Any perſon is allowed to have two or three inſurances or numbers on the ſame life, whereby ſuch perſon will be intitled to a claim on each number ſo inſured; and every claimant is impowered to put in a new life, in the room of one deceaſed, within twelve kalendar months next after the end of the current year. By becoming members of this ſociety, clergymen, phyſicians, lawyers, tradeſmen, and all whoſe income ceaſes at the time of their death, may, in all probability, leave to their families a claim of not leſs than 100 l. for every 5 l. annually paid in. See the article ASSURANCE.

The value of inſurances upon lives, depends upon the probability of the continuance of any propoſed life or lives, during any propoſed term. Any queſtions of this kind may be determined from Dr. Halley's table, and from the principles of the doctrine of Chances. But, as far as we can learn of the practice on ſuch occaſions, the premiums paid to inſurers are generally higher than any computation founded on obſervations concerning the probabilities of human life, will warrant. Thus it is not unuſual to make a perſon pay 5 *per cent.* for the inſurance of his life for a twelvemonth, that is, in caſe the perſon dies within the year, the inſurer is to pay 100 l. for every 5 l. received. Now it appears from Dr. Halley's table, which eſtimates the probability of life low enough, that 5 *per cent.* is an adequate value only for a life of an advanced age, ſuch as ſixty-four.

INTACTÆ, in conics, an appellation ſometimes given to the aſymptotes. See the article ASYMPTOTE.

INTAGLIOS, precious ſtones on which are engraved the heads of great men, inſcriptions, and the like; ſuch as we frequently ſee ſet in rings, ſeals, &c.

INTAIL, or TAIL. See the article TAIL.

INTAKERS, a ſort of robbers in the north of England, who formerly received the booty which their confederates the out-partners, brought from the borders of Scotland.

INTEGER, in arithmetic, a whole number, in contradiſtinction to a fraction. See NUMBER and FRACTION.

INTEGRAL, or INTEGRANT, in philoſophy, appellations given to parts of bodies which are of a ſimilar nature with the whole: thus filings of iron have the ſame nature and properties as bars of iron.

Bodies may be reduced into their integrant parts by triture or grinding, limation or filing, ſolution, amalgamation, &c.

INDENTMENT, in law, is the intention, deſign, or true meaning of a perſon or thing, which frequently ſupplies what is not fully expreſſed: but tho' the intent of parties in deeds and contracts is much regarded by the law, yet it cannot take place againſt the rules of law.

INDENTMENT *of crimes*; this, in caſe of treaſon, where the intention is proved by circumſtances, is puniſhable in the ſame manner as if it was put in execution. So if a perſon enter a houſe in the night-time, with an intent to commit burglary, it is felony; alſo an aſſault, with an intent to commit a robbery on the highway, is made felony, and puniſhed with tranſportation. 7 Geo. II. c. 21.

INTERCALARY, *intercalaris*, in chronology, an appellation given to the odd day inſerted in leap-year; which was ſo called from *calo, calare*, to proclaim, it being proclaimed by the prieſts with a loud voice. See the article BISSEXTILE.

INTERCEPTED AXIS, in conic ſections, the ſame with abſciſſe. See ABSCISSE.

INTERCESSION, in roman antiquity, the act of a tribune of the people, or other magiſtrate, whereby he inhibited the act of another magiſtrate.

The tribunes had an unlimited power to interceed or controul the acts of every other magiſtrate, who could only inhibit the acts of inferior magiſtrates. See the article TRIBUNE.

INTERCOLUMNIATION, in architecture, denotes the ſpace between two columns, which is always to be proportioned, to the height and bulk of the columns.

Some authors have laid down the following proportions for the intercolumniations, at a medium, *viz.* in the tuſcan order, it muſt be equal to four diameters of the column below; in the doric, to three

three; in the ionic, to two; in the corinthian to two and a quarter; and in the compoſite, to one and an half.

INTERCOMMONING, in law, is when the commons of two manors lie together, and the inhabitants of both have, time out of mind, cauſed their cattle to feed promiſcuouſly on them.

INTERCOSTAL, in anatomy, an appellation given to ſuch muſcles, nerves, arteries and veins as lie between the ribs. See the article RIBS.

The intercoſtal muſcles are thin fleſhy plates, two between each two ribs, one external and the other internal. The intercoſtal nerves are branches of the fifth and ſixth pair; the intercoſtal arteries are branches of the two ſubclavians; and the intercoſtal veins ariſe from the vena azygos. See the articles MUSCLE, NERVES, ARTERY, *&c.*

INTERDICT, an eccleſiaſtical cenſure, by which the church of Rome forbids the performance of divine ſervice in a kingdom, province, town, *&c.* This cenſure has been frequently executed in France, Italy and Germany; and in the year 1170, pope Alexander III. put all England under an interdict, forbidding the clergy to perform any part of divine ſervice, except baptizing of infants, taking confeſſions, and giving abſolution to dying penitents. But this cenſure being liable to the ill conſequences of promoting libertiniſm and a neglect of religion, the ſucceeding popes have very ſeldom made uſe of it.

There was alſo an interdict of perſons, who were deprived of the benefit of attending on divine ſervice. Particular perſons were alſo antiently interdicted of fire and water, which ſignified a baniſhment for ſome particular offence: by this cenſure no perſon was allowed to receive them, or allow them fire or water; and being thus wholly deprived of the two neceſſary elements of life, they were doubtleſs under a kind of civil death.

INTEREST, is the premium of money paid for the loan or uſe of money; and is diſtinguiſhed into two kinds, ſimple and compound.

Simple intereſt is that which is paid for the principal, or ſum lent, at a certain rate or allowance made by law, or agreement of parties, whereby ſo much as 5 l. or 6 l. or any other ſum, is paid for 100 l. lent out for one year; and more or leſs proportionally for greater or leſſer ſums, and for more or leſs time. For example, if it is 5 l. to 100 l. for one year, it is 2 l. 10 s. for half a year, and 10 l. for two years: alſo 10 l. for one year of 200 l. and 5 l. for half a year; and ſo on, for other ſums and times. Thus, as the law, or agreement of parties, fixes a certain ratio, or, as we call it, rate of intereſt, which is ſo much on the 100 l. for one year; from this we can eaſily find the proportional intereſt on 1 l. for one year, being plainly the $\frac{1}{100}$ part of the intereſt of 100 l. ſo if this is 5 l. that is .05 l. if this is 6 l. that is .06 l. and if this is 5 l. 10 s. or 5.5 l. that is .055 l. Wherefore, if we underſtand the rate of intereſt to be the intereſt of 1 l. for one year, the more common queſtions about ſimple intereſt will relate to theſe four things, *viz.* any principal ſum, its intereſt, the time in which it gives that intereſt, and the rate, or intereſt of 1 l. for one year, according to which that principal, intereſt and time are adjuſted to one another.

From which we have four problems; in the rules whereof we ſuppoſe the principal and intereſt expreſſed in the denomination of pounds, by reducing what is leſs than 1 l. to a decimal of 1 l. and the time to be expreſſed in years, and decimal parts of one year.

Prob. I. Having any principal ſum, and time, with the rates of intereſt given, to find the intereſt of that ſum for that time and rate.

Rule: Multiply the principal rate and time continually into one another, the product is the intereſt ſought.

Obſerve, if we expreſs the principal by p, the intereſt by n, the time by t, and the rate by r, then this rule is thus repreſented $n=ptr$.

Example: The rate of intereſt being .05 l. what is the intereſt of 85 l. for 4 years and 3 quarters, or 4.75 years?

Anſwer. 20 l. 3 s. 9 d. $=20.1875$ l. $=85\times4.75\times.05$.

Which is thus performed:

$$\begin{array}{r}
85=p\\
4.75=t\\
\hline
425\\
595\\
340\\
\hline
403.75\\
.05=r\\
\hline
20.1875 \text{ pounds.}
\end{array}$$

Which decimal is reduced by multiplying it by 20, 12, and 4: thus,

$$\begin{array}{r} .1875 \\ 20 \\ \hline 3.7500 \text{ ſhillings} \\ 12 \\ \hline 15000 \\ 7500 \\ \hline 9.0000 \text{ pence} \end{array}$$

Prob. II. Having the rate, principal and intereſt, to find the time.

Rule: Divide the intereſt by the product of the rate and principal, the quote is the time: thus, $t=\frac{n}{rp}$.

Example: The rate .05 l. principal 85 l. intereſt 20 l. 3 s. 9 d. or 20.1875 l. the time is 4.75 years, or 4 ¾ years. Thus, $4.75=\frac{20.1875}{85\times .05}$, or $\frac{20.1875}{4.25}$.

Demonſtration: This rule is deduced from the former; thus, ſince $n=trp$, then dividing both ſides by rp, it is $\frac{n}{rp}=t$.

Prob. III. Having the principal, intereſt, and time, to find the rate.

Rule: Divide the intereſt by the product of principal and time, the quote is the rate: thus, $\frac{n}{tp}=r$.

Example: $n=20.1875$ l. $t=4.75$ years, $p=85$ l. then is $r=.05$ l. $=\frac{20.1875}{4.75\times 85}$, or $\frac{20.1875}{403.75}$.

Demonſtration: Since $n=trp$, divide both by tp; it is $\frac{n}{tp}=r$.

Prob. IV. Having the rate, time and intereſt, to find the principal.

Rule: Divide the intereſt by the product of rate and time, the quote is the principal; thus, $\frac{n}{tr}=p$.

Example: $n=20.1875$ l. $t=4.75$ years, $r=.05$ l. then is $p=85$ l. $=\frac{20.1875}{4.75\times .05}$, or $\frac{20.1875}{.2375}$.

Demonſtration: Since $n=trp$, divide both ſides by tr, the quote is $\frac{n}{tr}=p$.

Scholium: If the intereſt of any ſum for any time is added to the principal, this total or ſum is called the amount, (*viz.* of the principal and its intereſt for that time.) And then from theſe four things, *viz.* the amount, which we call a, the principal, the time and rate, ariſe four problems; for having any three of theſe the fourth may always be found. Thus,

Prob. V. Having the principal, time and rate, to find the amount.

Rule: Find the intereſt by prob. I. add it to the principal, the ſum is the amount. Thus, by prob. I. the intereſt is ptr; therefore the amount is $a=ptr+p$. The reaſon is evident.

Note: Becauſe $ptr=rt\times p$, and $p=1\times p$; therefore $rtp+p=\overline{rt+1}\times p=a$. And ſo the rule may be expreſſed thus; to the product of the rate and time add unity, and multiply the ſum by the principal, the product is the amount.

Example: What is the amount of 246 l. principal in 2 years and ½, or 2.5 years, the rate of intereſt being .05 l? Anſwer 246 l. + 30.75 l. = 276 l. 15 s. for the intereſt is $=246\times .05\times 2.5=30.75$ l. Or thus; $.05\times 2.5=.125$ l. to which add 1, it is $1+.125$ l. which multiplied by 276, produces 276.75 l.

Prob. VI. Given the principal, amount and time, to find the rate.

Rule: Take the difference betwixt the principal and amount, and divide it by the product of the time and principal, the quote is the rate: thus, $r=\frac{a-p}{tp}$.

Example: Suppoſe $a=276.75$ l. $p=246$, $t=2.5$ years; then is $r=.05$ l. $=\frac{276.75-246}{2.5\times 246}=\frac{30.75}{615}$.

Demonſtration: Since by prob. V. $a=trp+p$, take p from both ſides, it is $a-p=trp$; then divide both by tp, it is $\frac{a-p}{tp}=r$.

Prob. VII. Given the amount, principal and rate, to find the time.

Rule: Take the difference of the amount and principal, and divide it by the product of the principal and rate, the quote is the time: thus $t=\frac{a-p}{rp}$.

Example: Suppoſe $a=276.75$ l. $p=246$ l. $r=.05$; then is $t=2.5$ years $=\frac{276.75\text{ l.}-246}{246\times .05}=\frac{30.75}{12.3}$.

Demonſtration: In the laſt problem, $a-p$ was equal to trp; and dividing both by rp, it is $\frac{a-p}{rp}=t$.

Prob. VIII. Given the amount, rate, and time, to find the principal.

Rule: Add 1 to the product of the rate and time, and by that ſum divide the amount, the quote is the principal: thus, $p = \frac{a}{rt+1}$.

Example: $a = 276.75$ l. $r = .05$ l. $t = 2.5$ years; then is $p = 246 = \frac{276.75}{2.5 \times .05 + 1} = \frac{276.75}{1.125}$.

Demonſtration: By prob. V. it is $a = \overline{rt+1} \times p$; therefore dividing both ſides by $\overline{rt+1}$, it is $\frac{a}{rt+1} = p$.

Compound INTEREST, is that which is paid for any principal ſum, and the ſimple intereſt due upon it for any time, accumulated into one principal ſum. Example: if 100 l. is lent out for one year at 6 l. and if at the end of that year the 6 l. due of intereſt be added to the principal, and the ſum 106 l. be conſidered as a new principal bearing intereſt for the next year (or whatever leſs time it remains unpaid) this is called compound intereſt, becauſe there is intereſt upon intereſt, which may go on by adding this ſecond year's intereſt of 106 l. to the principal 106 l. and making the whole a principal for the next year.

Now, although it be not lawful to let out money at compound intereſt, yet in purchaſing of annuities or penſions, *&c.* and taking leaſes in reverſion, it is very uſual to allow compound intereſt to the purchaſer for his ready money; and, therefore, it is very neceſſary to underſtand it.

Let therefore, as before, $p =$ the principal put to intereſt; $t =$ the time of its continuance; $a =$ the amount of the principal and intereſt; $R =$ the amount of 1 l. and its intereſt for one year, at any given rate, which may be thus found.

Viz. 100 : 106 :: 1 : 1,06 = the amount of 1 l. at 6 *per cent.* Or 100 : 105 :: 1 : 1,05 = the amount of 1 l. at 5 *per cent.* And ſo on, for any other aſſigned rate of intereſt.

Then if

$R =$ amount of 1 l. for 1 year, at any rate.
$R^2 =$ amount of 1 l. for 2 years,
$R^3 =$ amount of 1 l. for 3 years,
$R^4 =$ amount of 1 l. for 4 years,
$R^5 =$ amount of 1 l. for 5 years,

Here $t = 5$. For $1 : R :: R : RR :: RR : RRR :: RRR : R^4 :: R^4 : R^5$: *&c.* in a geometrical progreſſion continued; that is, as 1 l. : is to the amount of 1 l. at 1 year's end :: ſo is that amount : to the amount of 1 l. at 2 years end, *&c.* Whence it is plain, that compound intereſt is grounded upon a ſeries of terms, increaſing in geometrical proportion continued; wherein t (*viz.* the number of years) does always aſſign the index of the laſt and higheſt term, *viz.* the power of R, which is R^t.

Again, as $1 : R^t :: p : pR^t = a$ the amount of p for the time, that $R^t =$ the amount of 1 l. That is, as 1 l. : is to the amount of 1 l. for any given time :: ſo is any propoſed principal, or ſum : to its amount for the ſame time.

From what has been ſaid, we preſume, the reaſon of the following theorems will be very eaſily underſtood.

Theorem I. $pR^t = a$, as above.

From hence the two following theorems are eaſily deduced.

Theorem II. $\frac{a}{R^t} = p$.

Theorem III. $\frac{a}{p} = R^t$.

By theſe three theorems, all queſtions about compound intereſt may be truly reſolved by the pen only, *viz.* without tables: though not ſo readily as by the help of tables calculated on purpoſe.

Example I. What will 256 l. 10 s. amount to in 7 years, at 5 *per cent. per annum*, compound intereſt?

Here is given $p = 256.5$, $t = 7$, and $R = 1.05$, which being involved until its index $= t$ (*viz.* 7) will become $R^7 = 1.40710$. Then $1.40710 \times 256.5 = 360.92115 = a = 360$ l. 18 s. 5 d. which is the anſwer required.

Example II. What principal or ſum of money muſt be put out to raiſe a ſtock of 360 l. 18 s. 5 d. in ſeven years, at 5 *per cent per annum*, compound intereſt?

Here is given $a = 360.92115$, $R = 1.05$ and $t = 7$ to find p by theorem II. Thus $R^t = 1.40710$ ($360.92115 = a$) $256.5 = p$. That is, $p = 256$ l. 10 s. which is the ſum or principal required.

Example III. In what time will 256 l. 10 s. raiſe a ſtock of (or amount to) 360 l. 18 s. 5 d. allowing 5 *per cent per annum*, compound intereſt?

Here is given $p = 256.5$, $a = 360.92115$, $R = 1.05$. To find t by theorem III. $R^t = \frac{a}{p} = \frac{360.92115}{256.5} = 1.40710$. which being continually divided by $R = 1.05$

until nothing remain, the number of thoſe diviſions will be $= 7 = t$.

Thus 1.05) 1.40710 (1.3400, and 1.05) (1.3400)1.2762, and 1.05(1.2762)1.2155, and ſo on until it becomes 1.05) 1.05 (1. which will be at the ſeventh diviſion.

Therefore it will be $t=7$, the number of years required by the queſtion.

Example IV. If 256 l. 10 s. will amount to, or raiſe a ſtock of 360 l. 18 s. 5 d. in 7 years time, what muſt the rate of intereſt be, *per cent. per annum.*

Here is given $p=256.5$, $a=360.92115$, and $t=7$; quere R. By theorem III. $\frac{a}{p}=R^t=1.40710$; as before in the laſt example. And if $R^t=R^7=1.40710$, then $R=\sqrt[7]{1.40710}$, which may be thus extracted.

$$\begin{array}{r|c|l} \text{Put} & 1 & r+e=R,\ \text{then} \\ 1 \circledcirc 7 & 2 & r^7+7r^6e+21r^5ee,\ \&c.=R^7=1.40710=G \\ 2-r^7 & 3 & 7r^6e+21r^5ee,\ \&c.=G-r^7 \\ 3\div 7r^5 & 4 & re+3ee=\frac{G-r^7}{7r^5}=D \\ 4\div r+3e & 5 & e=\frac{D}{r+3e} \end{array}$$

Let $r=1$, then $D=0.0575$.

$$\begin{array}{lrl} \text{Operation.} & r=1.00\,\Big) & 0.0575\ \Big(\ 0.05 \\ & +3e=\underline{.15}\,\Big) & \underline{\ \ 575}\ \Big(\\ & \text{Divisor}\ \ 1.15 & \end{array}$$

$$\text{First}\quad \left.\begin{array}{r} r=1.00 \\ +e=0.05 \end{array}\right\} = 1.05 = R.$$

Then $1 : 0.05 :: 100 : 5$ the rate *per cent.* required.

Interest, in law, is generally taken for a chattel real, or a leaſe for years, &c. but more for a future term.

An eſtate in lands, &c. is better than a bare intereſt therein; yet, according to the legal ſenſe of the word, an intereſt extends to eſtates and titles which a perſon has in or out of lands, &c. for by grant of a perſon's whole intereſt in land, a reverſion, as well as poſſeſſion, in ſimple fee, paſſes.

INTERJECTION, in grammar, an indeclinable part of ſpeech, ſignifying ſome paſſion or emotion of the mind.

As the greateſt part of the expreſſions uſed on theſe occaſions are taken from nature alone, the real interjections, in moſt languages, are monoſyllables; and as all nations agree in theſe natural paſſions, ſo do they agree in the ſigns and indications of them, as of love, mirth, &c.

The greeks confound their interjections with adverbs, and the hebrews confound them with their adverbs and prepoſitions, calling them all by the general name particle.

INTERIM, a name given to a formulary, or kind of confeſſion of the articles of faith, obtruded upon the proteſtants after Luther's death by the emperor Charles V. when he had defeated their forces; ſo called becauſe it was only to take place in the interim (mean time) till a general council ſhould have decided all points in diſpute between the proteſtants and the romaniſts. It retained moſt of the doctrines and ceremonies of the romaniſts, excepting that of marriage, which was allowed to prieſts, and communion to the laity under both kinds. Moſt of the proteſtants rejected it. There were two other interims, one of Leipſic the other of Franconia.

INTERLOCUTORY ORDER, in law, an order that does not decide the cauſe, but only ſome matter incident thereto, which happens between the beginning and end of a cauſe; as when, in chancery or exchequer, the plaintiff obtains an order for an injunction until the hearing of the cauſe; which order, not being final, is called interlocutory.

INTERLOPERS, are properly thoſe who, without due authority, hinder the trade of a company or corporation lawfully eſtabliſhed, by dealing in the ſame way.

INTERLUDE, an entertainment exhibited on the theatre between the acts of a play to amuſe the ſpectators while the actors take breath and ſhift their dreſs, or to give time of changing the ſcenes and decorations.

In the antient tragedy, the chorus ſung the interludes, to ſhew the intervals between the acts. In after times, they made uſe of the pantomimes to relieve the audience, that they might not grow weary of the play; a practice which can never be mentioned to their honour: for it is certain evidence of a bad taſte, when the audience cannot bear to ſit out a dramatic entertainment, without being relieved by ſuch low diverſions. But we have not the leaſt reaſon to wonder a this, who have ſeen, in our own time and nation, rope and ladder-dancers, and other notable artiſts of this claſs, not only admitted upon the ſtage, but received there with the utmoſt applauſe. Interludes now are generally ſongs, dances, or concerts of muſic. Ariſtotle and Horace give it for a rule, that interludes ſhould conſiſt of ſongs founded on the principal parts of the drama.

INTERLUNIUS MORBUS, the ſame with the epilepſy. See EPILEPSY.

INTERMEDIATE, is uſually underſtood of the ſpace of time elapſed from any certain point to any other.

INTERMEWING, in falconry, is a hawk's mewing, from the firſt change of her coat, till ſhe turn white.

INTERMITTENT, or INTERMITTING FEVERS, ſuch fevers as go off and ſoon return again, in oppoſition to thoſe which are continual. See FEVER.

Theſe fevers are diſtinguiſhed into various claſſes, according to the interval of time between the relapſe into them, as tertian fever, quartan fever, *&c.* See the articles TERTIAN, QUARTAN, *&c.*

It may be obſerved, that intermittents in general are either vernal, and rage from February till Auguſt; or autumnal, and rage from Auguſt to February. Fevers of this kind begin with an oſcitation, pandiculation, wearineſs, weakneſs, cold, horror, rigor, tremor, and paleneſs of the extremities, a difficult reſpiration, an anxiety, a nauſea, a vomiting, a quick, weak, and ſlow pulſe. The more violent and numerous theſe ſymptoms are, the worſe the fever is; and afterwards, the heat and other ſymptoms are the worſe. This is the firſt ſtage of intermittent fevers, which correſponds to the increaſe of continual fevers, and is of all other ſtages the moſt dangerous: for in this condition, the urine is generally crude and thin. This ſtage of intermittent fevers is ſucceeded by another, which begins with heat, redneſs, a ſtrong, large, and free reſpiration, a ſmall anxiety, a large and ſtrong pulſe, an exceſſive thirſt, a pain in the limbs and head, generally a redneſs of the urine: this ſtage correſponds to the ſtate and height of continual fevers. Then laſt of all, there generally appears a profuſe ſweat, a remiſſion of all the ſymptoms, a thick urine, with a ſediment reſembling black duſt, ſleep, a total abſence of the fever, laſſitude, and weakneſs.

Intermittent fevers frequently terminate in thoſe of the acute and dangerous kind, which is generally owing to an exceſſive heat, and too briſk a motion of the fluids. The cure requires that we ſhould uſe aperient, ſaline, alkaline, aromatic, mineral, diluting, mild, and oleaginous ſubſtances, heat, motion, fomentation, and friction, during the intermiſſion, or in the firſt ſtage; the medicines of this kind are all Tachenius's ſalts of herbs: the moſt conſiderable of which are obtained from wormwood, carduus benedictus, and ſtalks of beans, nitre, antimoniated nitre, diaphoretic antimony unwaſhed, ſal ammoniac, ſal prunella, and ſal polychreſtus, tartarus regeneratus, tartarus tartariſatus, ſalt of tartar, reduced to a ſaponaceous maſs with oil of turpentine, and all the parts of all the aromatic herbs, eſpecially of thoſe which are reſolvent. In order to purge the primæ viæ from the redundant ſordes, a purge or a vomit is often beneficial, exhibited ſo long before the paroxyſm that its operation may be over before the fit comes on. That an intermitting fever, ſays Dr. Mead, is not carried off by the peruvian bark with a proper degree of certainty, without premiſing a vomit, or a purge, or both, is not unknown to phyſicians; but to join ſome mild cathartic to this remedy will perhaps appear new in practice. For it is commonly thought among us, that this medicine has little or no effect, unleſs the patient be coſtive while he takes it; but long experience has taught me, continues the doctor, that it is quite neceſſary to add a ſmall quantity of rhubarb to this febrifuge, ſo as to procure two ſtools at leaſt every day; nor have I ever obſerved that this procedure has leſſened its virtue, but rather rendered it more efficacious.

However, the doctor obſerves, that it ſometimes happens that this febrifuge fails in true intermittents, which failure he aſcribes generally to a bad habit of body, in which caſe the phyſician ſhould uſe his beſt endeavours to diſcover in what part the fault lies; and it will be commonly found to be in the viſcera and glands of the abdomen. Upon this account, he thinks it neceſſary to preſcribe ſome purges, and ſometimes vomits; and in the intermediate days, deobſtruents and ſtomachics; the beſt of which are aromatic bitters, and preparations of ſteel.

INTERNAL, in general, ſignifies whatever is within a thing.

Euclid (lib. I. prop. 32.) proves, that

the ſum of the three angles of every triangle is equal to two right angles; whence he deduces ſeveral uſeful corollaries. See the article TRIANGLE.

He likewiſe deduces, from the ſame propoſition, this theorem, *viz*, that the ſum of the angles of every rectilinear figure, is equal to twice as many right angles, as the figure hath ſides, excepting or ſubtracting four.

INTERNODIUM, among botaniſts, denotes the ſpace between two knots or joints of the ſtalks of barley, oats, and the like plants.

INTEROSSEUS, in anatomy, an appellation given to the muſcles which move the figures and toes, from their being ſituated between the bones of thoſe part. See MUSCLE, FLEXOR, &c.

INTERPOLATION, among critics, denotes a ſpurious paſſage, inſerted into the writings of ſome antient author.

One great rule with regard to the expunging interpolations, is, that the reſtitution be perfectly agreeable to the reſt of the work.

INTERPRETER, in general, denotes a perſon who explains the words or writings of another, ſo as to make them intelligible to thoſe who did not underſtand them before.

INTERREGNUM, the time during which the throne is vacant, in elective kingdoms; for in ſuch as are hereditary, like ours, there is no ſuch thing as an interregnum.

INTERREX, the magiſtrate who governs during an interregnum.

In antient Rome, this magiſtrate was continued even after the expulſion of their kings.

INTERRMENT, the act of burying the dead. See the article BURIAL.

INTERROGATION, *or point of* INTERROGATION, in grammar, a character of this form (?) ſerving to denote a queſtion.

INTERROGATION, in rhetoric, is a figure, whereby the orator propoſes ſomething by way of queſtion; which, it muſt be owned, greatly enlivens the diſcourſe.

INTERROGATORIES, in law, are queſtions wrote down, and demanded of the witneſſes examined in a cauſe, more eſpecially in the court of chancery. Theſe interrogatories muſt relate only to the neceſſary point, and be either drawn up or peruſed, and alſo ſigned by counſel: but care muſt be taken, that they are not calculated to lead a perſon in what he has to ſay, by putting words as it were into his mouth, as, did you not ſee ſuch a thing done? the depoſitions taken upon ſuch interrogatories will be ſuppreſſed; for they ought not to lean to one ſide more than another, and therefore ſhould be expreſſed after this manner, did you ſee or not ſee? The examiners, and alſo the commiſſioners who examine the witneſſes produced on interrogatories, muſt examine only one interrogatory at a time, and not aſk any idle queſtions, or ſet down impertinent anſwers.

INTERRUPTION, in matters of proportion, ſignifies the ſame with disjunction, or disjunct proportion. See the article DISCRETE.

Interruption is noted thus, (: :) and intimates the breaking off the ratio in the middle of four disjunct or diſcrete proportionals; as, A : B : : C : D, that is as A is to B, ſo is C to D. See the articles PROPORTION, RATIO, &c.

INTERRUPTION is likewiſe a figure in rhetoric, wherein a perſon, to ſhew his paſſion, breaks off his diſcourſe ſuddenly and abruptly.

INTERSECTION, in the mathematics, ſignifies the cutting of one line or plane by another: thus, we ſay, that the mutual interſection of two planes is a right line. See LINE and PLANE.

INTERSOILING, in huſbandry, is laying one kind of ſoil or mould upon another, as clay on ſand, ſand on earth, &c.

INTERSPINALES *colli*, in anatomy, ſmall fleſhy muſcles of the neck, ariſing from the ſuperior parts of each double ſpinal proceſs of the neck, except of the ſecond vertebra; and inſerted into the inferior parts of all the double ſpines. When theſe muſcles act, they draw the ſpines of the vertebræ of the neck nearer each other.

INTERSTELLAR, a word uſed by ſome authors to expreſs thoſe parts of the univerſe that are without and beyond our ſolar ſyſtem.

In the interſtellar regions are ſuppoſed to be ſeveral other planetary ſyſtems moving round each fixed ſtar as the center of their motion, as the ſun is that of ours. And if it be true, as is not improbable, that each fixed ſtar may be thus a ſun to ſome habitable orbs that may move round it, the interſtellar world will be infinitely the greater part of the univerſe.

INTERTIES, in architecture, thoſe ſmall pieces of timber that lie horizontally bebetween the ſommers, or between them and the ſell, or reſon.

INTERTRANSVERSALES *colli* in anatomy, certain muſcles ſituated among the tranſverſe apophyſes of the vertebræ: they ariſe from the lower vertebra, and are inſerted into that next above: they are of the ſame ſize and figure with the interſpinales.

INTERVAL, in muſic, the difference between two ſounds, in reſpect of acute and grave; or, that imaginary ſpace terminated by two ſounds, differing in acuteneſs or gravity.

When two or more ſounds are compared in this relation, they are either equal or unequal in the degree of time: ſuch as are equal are called uniſons, with regard to each other, as having one tune; the other, being at a diſtance from each other, conſtitute what we call an interval in muſic; which is properly the diſtance in time between two ſounds.

Intervals are diſtinguiſhed into ſimple and compound.

A ſimple interval, is without parts or diviſions. Such are the octave, and all that are within it; as the ſecond, third, fourth, fifth, ſixth, and ſeventh, with their varieties.

A compound interval, conſiſts of ſeveral leſſer intervals: ſuch are all thoſe greater than the octave: as the ninth, tenth, eleventh, twelfth, &c. with their varieties.

Table of intervals, ſimple and compound.

1	2	3	4	5	6	7	Simple	Intervals	
8	9	10	11	12	13	14	Double		Compound Intervals.
15	16	17	18	19	20	21	Triple		
22	23	24	25	26	27	28	Quadruple.		
29	30	&c							

Thoſe in the upper line are the ſimple intervals, the other three the compound ones, *i. e.* ſuch as are either doubled, tripled, or quadrupled.

To reduce a compound interval to a ſimple one, Mr. Broſſard gives this rule: From the denominator thereof take ſeven, and what remains is the ſimple interval; as from a thirteenth take ſeven, there remains ſix, which ſhews the thirteenth to be the ſixth doubled: again, from twenty-ſix take ſeven three times, which are twenty-one, and five remains; therefore, ſays he, the twenty ſixth appears to be the fifth quadrupled.

But this diſtinction, into ſimple and compound, regards practice only, becauſe there is really no ſuch thing as a leaſt interval. Beſides by a ſimple interval here, is not meant the leaſt practiſed, but ſuch as tho' it were equal to two or more leſſer, which are in uſe; yet, when we would make a ſound move ſo far up and down, we always paſs immediately from one of its terms to the other.

What is meant then by a compound interval, will be very plain; it is ſuch whoſe terms are in practice, taken either in immediate ſucceſſion, or ſuch where the ſound is made to riſe and fall from the one to the other, by touching ſome intermediate degree; ſo that the whole becomes a compoſition of all the intervals from one extreme to the other.

What we now call a ſimple interval, the antients called diaſtem; and our compound one, they called ſyſtem. Each of theſe has differences; even of the ſimple, there are ſome greater and ſome leſſer, but they are always diſcord; but of the compound or ſyſtem, ſome are concord, and others diſcord. Uniſons, 'tis plain, cannot poſſibly have any variety; for when there is no difference, as in uniſonance, which flows from a relation of equality, 'tis evident there can be no diſtinction: uniſons therefore are often called concords, (tho' they may not properly be ſo called.) But an interval depending on a difference of time, or a relation of inequality, admits of variety; and ſo the terms of every interval, according to their particular relation or difference, make either concord or diſcord. Some indeed have reſtrained the word concord to interval, making it include a difference of tune: But this is precarious; for as the word concord ſignifies an agreement of ſounds, it is certainly applicable to uniſons in the firſt degree. Intervals, 'tis plain, may differ in magnitude, and there may be an infinite variety, according to the poſſible degrees of tune; for there is no difference ſo great or ſo little, but a greater or leſſer may poſſibly be conceived: 'tis true, with regard to practice, there are limits which are the greateſt and leaſt intervals our ears can judge of, and which may actually be produced by voice or inſtrument.

The degrees of tune are proportionable to the number of vibrations of the ſonorous body, in a given time; or the velocity of their courſes and recourſes. Now theſe differences in tune conſtitute, as has been already ſaid, the intervals in muſic; theſe therefore muſt be greater or leſſer, as the differences are; and 'tis the quantity of theſe, which is the ſubject of the mathematical part of muſic.

Theſe intervals are meaſured, not in the ſimple differences or arithmetical ratios of the numbers expreſſing their vibrations or lengths; but in their geometric ratios, and vice verſa: it is however to be obſerved, that in comparing the equality of the intervals, the ratios expreſſing them, muſt be all of one ſpecies, otherwiſe this abſurdity would follow, that the ſame two ſounds may make different intervals. To determine in general, which of two or more intervals is the greateſt, take all the ratios as proper fractions, and the leaſt fraction will be the greateſt interval.

The antients were extremely divided about the meaſuring of intervals. Pythagoras and his followers meaſured them by the ratios of numbers. They ſuppoſed the differences of gravity and acuteneſs to depend on the different velocities of the motions that cauſe ſound; and thought therefore, that they could only be accurately meaſured by the ratios of thoſe velocities; which ratios were firſt inveſtigated by Pythagoras, on occaſion of his paſſing by a ſmith's ſhop, and obſerving a concord between the ſound of the hammers ſtriking on the anvil. Ariſtoxenus oppoſed this: he thought reaſon and mathematics had nothing to do in the caſe, and that ſenſe was the only judge in the diſpute; the other being too ſubtile, to be of any uſe. He therefore determined the octave, fifth and fourth, which are the moſt ſimple concords, by the ear; and by the difference of the fourth and fifth, he found out the tone, which he ſettled as an interval the ear could judge of; he alſo meaſured every interval by various additions and ſubſtractions, made of thoſe mentioned one with another. Ptolemy keeps a middle way between the two; he finds fault with one for deſpiſing reaſon, and with the other for excluding ſenſe; and ſhews how theſe two might mutually aſſiſt each other in this matter. Ariſtoxenus ſays, there are two principal differences in intervals; the firſt is that of magnitude, and the other as being concord and diſcord; for, ſays he, every concord differs in magnitude from every diſcord; which may be interpreted, that every interval is of a different compaſs or extent from another. As concords and diſcords, intervals have many differences; but of theſe, magnitude is the principal. But Euclid reckons five differences of intervals, firſt in magnitude; ſecond, in kind; third, in being either concord or diſcord; fourth, in being ſimple or compounded; and laſtly, rational or irrational. Firſt then, intervals differ in magnitude, in which reſpect ſome are called minor, ſuch as ditonus, triemitonium, tonus, hemitonium, and dieſis; others major, as diateſſaron, diapente, and diapaſon. In the genus or kind, intervals differ, as being either diatonic, chromatic, or enharmonic, *i. e.* divided as each of theſe require. As concords and diſcords they differ; the concords are diateſſaron, diapente, diapaſon, and the like; and all intervals leſs than a fourth or diateſſaron, are diſſonant, as well as thoſe ſituated between the concords. And laſtly, they differ as to rational and irrational: rational intervals are ſuch as we can diſtinguiſh by numbers, as the tone, hemitonium, ditonus, tritone, *&c.* The irrational are ſuch whoſe magnitudes vary in an irrational manner, *i. e.* ſo that we cannot fix a certain proportion between their two extremes in numbers.

But in the modern ſyſtem of muſic, intervals are founded on certain ratios or proportions expreſſible in numbers, which may all be analyſed into the prime numbers 2, 3, and 5. And all intervals may be found from the octave, fifth, and third major, which reſpectively correſpond to thoſe numbers. Theſe are the muſician's elements, from the various combinations of which, all the agreeable variety of relations of ſounds reſult. And Dr. Pepuſch, in the Phil. Tranſ. nº 481, aſſures us, it may be looked on as the ſtandard of truth; and that every interval that occurs in muſic is good or bad, as it approaches to, or deviates from what it ought to be on theſe principles. Mr. Euler, in his Nov. Theor. Muſ. defines an interval, the meaſure of the difference of an acute and grave ſound: thus, ſuppoſe three ſounds *a*, *b*, *c*, of which *c* is the moſt acute, *a* the moſt grave, and *b* the intermediate ſound. It appears, that the interval between the ſounds *a* and *c*, is the aggregate of the intervals between *a* and *b*, and between *b* and *c*. Therefore, if the interval between *a* and *b*, be equal to that between *b* and *c*, which happens when $a : b :: c : d$; the interval between *a* to *c*, will be double the interval *a* to *b*, or *b* to *c*. This being conſidered, it will appear that intervals ought to be expreſſed by the meaſures of the ratios, conſtituting the ſounds forming thoſe intervals: but ratios are meaſured by the logarithms of fractions, the numerators of which denote the acute ſounds, and the denominators the grave. Hence the interval between the ſounds *a* and *b*, will be expreſſed by the logarithm of the fraction $\frac{b}{a}$ which is uſually denoted by $L\frac{b}{a}$; or, which comes to the ſame, by $Lb - La$. The interval therefore of equal ſounds, *a* to *a*, will be null, as $La - La = o$. The interval called an octave, or diapaſon, will be expreſſed by the logarithm of 2; and the interval of the fifth or diapente, will be $L\frac{3}{2} = L\,3 - L\,2$. From whence it appears, that thoſe intervals are incommenſurable; ſo that no interval, however ſmall, can be an aliquot part, both of the octave and fifth. The like may be ſaid of the intervals $L\frac{3}{2}$ and $L\,^5$, and others whoſe logarithms are diſſimular. But intervals expounded by logarithms of numbers, which are powers of the ſame root, may be compared. Thus the interval of the ſounds 27 : 8, will be the interval of the ſounds 9 : 4, as 3 is to 2: for $L\frac{27}{8} = 3\,L\frac{3}{2}$, and $L\frac{9}{4} = 2\,L\frac{3}{2}$. Euler. *ibid.* p. 74. But tho' the logarithms of numbers, which are not powers of the ſame root, be incommenſurable, yet an approximating ratio of ſuch may be found. Thus, the meaſure of the octave is $L\,2 = 0.3010300$, and the meaſure of the fifth is $L\,3 - L\,2 = 0.1760913$. Hence the interval of the octave will be to that of the fifth, nearly as 3010300 to 1760913; which ratio being reduced to ſmaller terms, will give us theſe ſimpler expreſſions for the ratio of the octave and fifth, 2 : 1, 3 : 2, 5 : 3, 7 : 4, 12 : 7, 17 : 10, 29 : 17, 41 : 24, 53 : 31, which laſt is very near the truth. Euler. *ibid.* p. 75. In like manner, intervals may be divided into any number of equal parts: for this purpoſe we need only divide the logarithm of the propoſed interval into the ſame number of parts, and then find its correſponding number by the tables. The ratio of the number ſo found, to unity, will give the required ratio of the divided interval to its propoſed part. Thus let the third part of an octave be required; its logarithm will be $= 0.1003433 = \frac{1}{3}L\,2$: the ratio correſponding nearly to this, will be 63 : 50, or leſs accurately, 29 : 23, or 5 : 4, which laſt expreſſes the third major; and this is by the leſs knowing taken for the third part of an octave, and ſeems to be ſuch on our harpſichord and organs, where from C to E is a third, from E to G ♯ another, and from G ♯ or A ♭ to *c*, another third. But the more intelligent know, that G ♯ and A ♭ ought not to be reputed the ſame ſound, ſince they differ by a dieſis enharmonica, which is nearly equal to two commas.

INTERVALS, in gardening and huſbandry, the ſpaces left between the ſeveral rows of plants ſown or ſet in gardens or fields. See the article HUSBANDRY.

INTESTATE, in law, a perſon that dies without making a will; in which caſe, a diſtribution of his perſonal eſtate, after his debts and funeral charges are paid, is to be made among the wife and children of the deceaſed, or for want of ſuch, among the next of kin. Here the ſtatute, immediately upon the inteſtate's death, veſts an intereſt in the perſons intitled, ſo that if one dies before the diſtribution, his ſhare is to go to his executors and adminiſtrators, and not to the ſurvivors of the next akin to the inteſtate. See the article ADMINISTRATOR.

INTESTINES, in anatomy, long cylindrical, hollow, and membranaceous bodies; or rather, one ſuch continued body, or tube, reaching from the ſtomach to the anus.

In theſe we are to obſerve, 1. Their length, which is uſually ſix times the height of the perſon they belong to. 2. Their wonderful circumvolutions, and the uſes of them. 3. Their connection by means of the meſentery, with the vertebræ of the loins. 4. Their number, which tho' properly, as already obſerved, but one, yet is it uſually made ſix, whereof three are called the ſmall inteſtines, inteſtina tenuia, *viz.* the omentum, jejunum, and ilium; and the other three, the larger inteſtines, inteſtina craſſa, *viz.* the cœcum, colon, and rectum. See OMENTUM, JEJUNUM, *&c.*

The ſtructure and ſubſtance of the inteſtines are membranaceous; being formed, in every part, of five coats or tunices

The firſt is the common coat, from the peritonæum, and is membranaceous. The ſecond is cellular, and is called by late writers, tunica celluloſa Ruyſchii; it is continuous with the meſentery, and is to be diſcovered by inflating it: this coat, in fat animals, frequently contains abundance of fat. The third is muſcular; it is compoſed of a double ſeries of fibres, in part longitudinal, and in part annular; and theſe aſſiſt the motion of the guts. The fourth coat is nervous: it is furniſhed with abundance of cellules, vaſcules, and glands, and is thicker than the others: from this ariſe the rugæ, and the valves of the inteſtines. The fifth is the villoſe coat, which ſuſtains the terminations of the excretory veſſels, and the beginnings of the lacteals: hence, when nicely examined, it has the appearance of a ſieve: it is the organ of percolation of the chyle.

The inteſtines have veſſels in great abundance, running over every part of their ſubſtance. Their arteries are from the meſeriac ones; the upper meſeriac ſerving for the ſmaller inteſtines, the lower for the larger; and theſe make a multitude of very ſingular and ſurprizing anaſtomoſes. The veins are meſeriacs, and go off to the vena portæ and the liver. The nerves are ſent from the intercoſtals, and the par vagum. And beſide theſe we are to obſerve the lacteal veſſels. See the article LACTEAL.

The rectum, it is to be obſerved, receives blood-veſſels alſo from the hypogaſtrics. There are alſo, beſides the brunnerian glands of the duodenum, other glands in the inteſtines, called from the name of the perſon who diſcovered them, glandulæ Peyeri. Theſe, in the ſmall guts, are uſually little, congregate, and miliary; but ſometimes they are ſingle. They are larger as they are nearer to the duodenum, and ſmaller as they approach towards the great guts. Their office is to diſcharge into the inteſtines a liquor, which ſerves for the attenuation of the chyle; and for the lubricating of the inteſtines. In the larger guts, and in the vermiform appendage, they are ſingle and large, of a lenticular figure; and they are largeſt of all in the rectum. They have mouths, out of which there is ſecreted a fluid, which ſerves to lubricate the ſides of the inteſtines, and to ſoften the fæces, that they may be evacuated without pain.

The uſe of the ſmaller guts is to promote the formation of the chyle, to perfect its ſecretions, and to propel the remaining fæces to the larger. The office of the larger guts is to receive and collect the matter of the fæces, and at a proper time to expel it. See CHYLE.

In the annexed plate of the inteſtines, *a*, *a*, (plate CXLVI. fig. 3. nº 1.) repreſent the liver turned upwards, in order to ſhew the gall-bladder *b*. The cyſtic duct, marked *c*, uniting with the hepatic duct *d*, forms the ductus communis choledocus *e*. The vena portæ is marked *f*; ſome ſmall branches of the hepatic artery, *g*; the umbilical vein, *h*; the ſtomach, with its coronary veſſels, *i*, *i*, *i*; the ſpleen, *k*; a portion of the omentum, with ſome of the adipoſe glands, *l*, *l*, *l*; the windings of the ſmall inteſtines, *m*, *m*, *m*; part of the colon, *n*, *n*, *n*; the muſcular faſcia of the colon, *o*, *o*, *o*; the extremity of the colon, *p*, where it makes a flexure in order to form the rectum, *q*; the extremity of which, marked *r*, is called the anus. The ſphincter-muſcle of the anus, is marked *s*; and its elevators, *t*, *t*.

Nº 2. *ibid.* repreſents the oeſophagus, marked A; the ſtomach, marked B; the pancreas, marked C, C; the pancreatic duct, marked D; and the duodenum, marked E.

Falling out of the INTESTINES. See the article HERNIA.

Inflammation of the INTESTINES. See the article INFLAMMATION.

Wounds of the INTESTINES, eſpecially of the ſmall guts, admit of little or no hopes of a cure; yet as the great guts ſometimes admit of the ſuture to advantage, it is better to uſe a doubtful remedy than none: beſides that, by this means, the diſcharge of the chyle and fæces into the cavity of the abdomen, which would occaſion great miſchief, is prevented.

Small wounds of the inteſtines, not exceeding the ſize of a gooſe-quill, ſhould by no means be ſtitched, but left to nature; as they frequently unite much ſooner this way, than if irritated by the ſuture. But large wounds are to be ſtitched up with the glover's ſuture, before the inteſtine is returned.

To perform this, you are to be provided with a ſmall needle, threaded with ſilk; an aſſiſtant ſhould take hold of one part of the gut by a fine piece of linnen well aired, while the ſurgeon ſhould hold the other part in his left hand, and ſew up the whole wound after the glover's manner, leaving very ſmall ſpaces, not more than the twelfth of an inch each, between each of the ſtitches. The laſt ſtitch ſhould be faſtened with a knot, but the other end muſt hang about a foot out of the abdomen, by means of which the ſilk may be drawn out when the inteſtine is healed. After this is performed, the wound of the abdomen is next to be taken care of, and ſtitched up, keeping the lower or depending part of the wound open with a tent, till all the preternatural fluids are diſcharged out of the cavity of the abdomen, and till the union of the wound in the inteſtine ſhall give leave to draw away the ſilk with which the ſuture was performed on it. See the article GASTRORAPHY.

As the modern ſurgeons, however, have found that few are ſaved who have received any large wound in the inteſtines, and that in thoſe few who do recover, the wounded parts, from the fineneſs of the coat of the gut, do not properly unite, but rather adhere to the inner part of the peritoneum, or to the omentum, or to ſome other of the inteſtines, they rather chooſe now to let alone the operation of the ſuture of the gut, and ſubſtitute a gentler method of cure. They paſs a waxed thread through a fine needle, and with this they faſten the wounded part of the inteſtine to the internal orifice of the wound in the abdomen. The thread that in this caſe hangs out of the abdomen, is to be ſo firmly fixed by the application of ſticking-plaiſters to the wound, that the inteſtine cannot recede from the part to which it was faſtened, nor can it evacuate any of its contents into the cavity of the abdomen. When this operation is well performed, the inteſtine eaſily adheres to the internal part of the abdomen, and the patient ſuffers infinitely leſs pain and hazard, than from the former way of making the ſuture. The ſame method of cure alſo is the proper one for wounds of the ſtomach, where they are within the reach of the hand, and it is ſometimes crowned with ſucceſs. Where any part of the inteſtines is carried away, the caſe is plainly deſperate; yet ſome of the late eminent ſurgeons having obſerved, that the lips of the inteſtines, ſo wounded, would ſometimes unexpectedly adhere to the wound in the abdomen, took this hint from nature toward a cure in ſuch deſperate caſes. Whenever, therefore, a ſurgeon is called in a caſe of this kind, after diligently examining the ſtate of the upper part of the inteſtine which has ſuffered the loſs of ſubſtance, he ſhould ſtitch it to the external wound; for by this means the patient may not only be ſaved from inſtant death, but there have been inſtances where the wounded inteſtine has been ſo far healed, that the fæces which uſed to be voided by the anus, have been voided by the wound in the abdomen. And this, tho' from the neceſſity of wearing a tin or ſilver pipe, or keeping cloaths conſtantly upon the part to receive the excrement, may ſeem to be very troubleſome; yet it is ſurely far better to part with one of the conveniencies of life, than to part with life itſelf; beſides, the excrements that are voided by this paſſage, are not ſo offenſive in ſmell, as thoſe voided per anum.

The ſame method of cure may conveniently alſo be put in practice, where any part of the inteſtine is mortified, by having been thruſt out of the abdomen; for in this caſe if you tie up the meſenteric arteries, the corrupted or mortified part of the inteſtine may be cut off, and the remaining ſound part made to adhere to the wound of the abdomen. And it is ſurely better to try this method and ſave if it be only a few by it, than to leave all in this unhappy ſituation to periſh without help.

INTESTINAL, ſomething belonging to, or ſeated in the inteſtines. See the preceding article.

Heiſter gives the name of inteſtinal fever to a ſpecies of fever called by others meſenteric. See MESENTERIC.

To this ſpecies he alſo refers the dyſenteric, catarrhal, and petechial fevers. See FEVER, DYSENTERY, PETECHIÆ, &c.

INTRADA, ENTRY, in the italian muſic, is much the ſame with prelude or overture. See the article PRELUDE.

INTRANSITIVE, a grammatical term for ſuch verbs as are otherwiſe called neuter verbs. See the article VERB.

INTRENCHMENT, or RETRENCHMENT, in the art of war. See the article RETRENCHMENT.

INTRIGUE, or INTREAGUE, an aſſemblage of events or circumſtances, occurring in an affair, and perplexing the perſons concerned in it.

In this ſenſe, it is uſed to ſignify the nodus or plot of a play or romance; or that point wherein the principal characters are moſt embarraſſed, through the artifice and oppoſition of certain perſons, or the unfortunate falling out of certain accidents and circumſtances.

In tragedy, comedy, or an epic poem, there are always two deſigns; the firſt and principal is that of the hero of the piece. The ſecond contains the deſigns of all thoſe who oppoſe him: theſe oppoſite cauſes produce oppoſite effects; to wit, the efforts of the hero for the execution of his deſign, and the efforts of thoſe who thwart it. As thoſe cauſes and deſigns are the beginning of the action, ſo theſe efforts are the middle, and there form a knot or difficulty which we call the intrigue, that makes the greateſt part of the poem. It laſts as long as the mind of the reader or hearer is ſuſpended about the event of thoſe oppoſite efforts: the ſolution or cataſtrophe commences when the knot begins to unravel, and the difficulties and doubts begin to clear up.

The intrigue of the Iliad is twofold, the firſt comprehends three days fighting in Achilles's abſence, and conſiſts on the one ſide in the reſiſtance of Agamemnon and the Greeks, and on the other in the inexorable temper of Achilles. The death of Patroclus unravels this intrigue, and makes the beginning of a ſecond. Achilles reſolves to be revenged, but Hector oppoſes his deſign; and this forms the ſecond intrigue, which is the laſt day's battle.

In the Æneid there are alſo two intrigues, the firſt is taken up in the voyage and landing of Æneas in Italy; the ſecond is his eſtabliſhment there: the oppoſition he met with from Juno in both theſe undertakings, forms the intrigue.

As to the choice of the intrigue, and the manner of unravelling it, it is certain they ought both to ſpring naturally from the ground and ſubject of the poem. Boſſu gives us three manners of forming the intrigue of a poem; the firſt is that already mentioned; the ſecond is taken from the fable and deſign of the poet; in the third the intrigue is ſo laid, as that the ſolution follows from it of courſe.

INTRINSIC, a term applied to the inner, real, and genuine values, properties, &c. of any thing, in oppoſition to their extrinſic or apparent values, &c. See the article EXTRINSIC.

INTRUSION, in law, obtains where an anceſtor dies ſeiſed of an eſtate, or inheritance which is expectant upon an eſtate for life, and the tenant for life dies; after which a ſtranger enters before the heir, in which caſe he is ſaid to intrude.

Bracton ſays, that intruſion ſignifies any unlawful entry upon lands, &c. by a perſon who has no right to the ſame, in prejudice of the perſon to whom they are legally deſcended. The difference between an intruder and an abator, according to Fitzherbert, is this, *viz.* that an abator enters into lands, &c. void by the death of a tenant in fee, whilſt an intruder enters upon lands void by the death of a tenant for life or years. An entry on the king's lands and poſſeſſions upon the death of a tenant, &c. is termed intruſion againſt the king, for which an information may be exhibited; tho' before office is found, he that occupies the land ſhall not be an intruder, and yet the king is entitled to the profits thereof after the tenant's eſtate is ended.

INTRUSION DE GARD, was a writ formerly in uſe, where an infant or perſon within age entered upon his lands, and kept out his lord.

INTRUSIONE, is a writ which lies againſt an intruder at the ſuit of him that has the fee, &c. If a perſon has only an eſtate-tail, he may not have this writ, but is to bring a writ of formedon.

INTUITION, among logicians, the act whereby the mind perceives the agreement or diſagreement of two ideas, immediately by themſelves, without the intervention of any other; in which caſe, the mind perceives the truth as the eye doth the light, only by being directed towards it. Thus the mind perceives that white is not black, that three are more than two, and equal to one and two. See the article IDEA.

This part of knowledge, ſays Mr. Locke, is irreſiſtible, and, like the ſun-ſhine, forces itſelf immediately to be perceived as ſoon as ever the mind turns it view that way. It is on this intuition that all the certainty and evidence of our other knowledge depends; this certainty every one finds to be ſo great, that he cannot imagine, and therefore cannot require, a greater. See the articles JUDGMENT, KNOWLEDGE, DEMONSTRATION, &c.

INVALID, a perſon wounded, maimed, or diſabled for action by age, &c.

For the colleges or hoſpitals built for the reception and accommodation of invalids, or ſoldiers or ſeamen worn out and diſabled in the ſervice, ſee the articles College and Hospital.

INVECTED, in heraldry, denotes a thing fluted or furrowed.

Invected is juſt the reverſe of ingrailed, in which the points are turned outward to the field, whereas in invected they are turned inward to the ordinary, and the ſmall ſemicircles outward to the field. See plate CXLV. fig. 5.

INVECTIVE, in rhetoric, differs from reproof, as the latter proceeds from a friend, and is intended for the good of the perſon reproved; whereas the invective is the work of an enemy, and entirely deſigned to vex and give uneaſineſs to the perſon againſt whom it is directed.

INVENTION, denotes the act of finding any thing new, or even the thing thus found.

Invention is, according to lord Bacon, of two very different kinds, the one of arts and ſciences, the other of arguments and diſcourſe: the former he ſets down as abſolutely deficient. That the other part of knowledge is wanting, ſays he, ſeems clear; for logic profeſſes not, nor pretends to invent either mechanical or liberal arts; nor to deduce the operations of the one, or the axioms of the other: but only leaves us this inſtruction, "To believe every artiſt in his own art." His lordſhip further maintains, that men are hitherto more obliged to brutes than reaſon for inventions. Whence thoſe who have written concerning the firſt inventors of things, and origin of ſciences, rather celebrate chance than art, and bring in beaſts, birds, fiſhes and ſerpents, rather than men, as the firſt teachers of arts. No wonder, therefore, as the manner of antiquity was to conſecrate the inventors of uſeful things, that the Egyptians, to whom many arts owe their riſe, had their temples filled with the images of brutes, and but a few human idols amongſt them. As to the invention of arts, continues our author, we are rather beholden to the wild goat for chirurgery, to the nightingale for muſic, to the ſtork for clyſters, to the accidental flying off of a pot's cover for artillery, and, in a word, to chance, or any thing elſe, rather than logic.

Invention is therefore uſed for a ſubtilty of mind, or ſomewhat peculiar in a man's genius, which leads him to the diſcovery of things new; whence we ſay a man of invention.

Invention, according to Du Bos, is that part which conſtitutes the principal merit of works, and diſtinguiſhes the great genius from the ſimple artiſt.

Invention, in rhetoric, being one of the ſecond diviſions of invention, according to Bacon, ſignifies the finding out and chooſing of arguments which the orator is to uſe for proving his point, or moving his hearers paſſions.

This invention, in the opinion of that philoſopher, cannot properly be called invention, which is the diſcovery of things not yet known, and not the recollecting things that are known; the only uſe and office of this rhetorical invention being out of the ſtock of knowledge already laid up, to ſelect ſuch articles as make for the purpoſe. The ſame author divides the method of procuring a ſtock of matter for diſcourſe into two; the firſt of which is either by marking out and indicating the parts wherein a thing is to be ſearched after, which he calls the topical way; and the ſecond is by laying up arguments for uſe that were compoſed before hand, and which he calls the promptuary way. For the method of invention, ſee the article Method.

Cicero wrote four books upon invention, whereof two only are remaining. Invention, according to this author, is the principal part of oration.

Invention, in poetry, is applied to whatever the poet adds to the hiſtory of the ſubject he has choſen, as well as to the new turn he gives it.

Invention, in painting, is the choice which the painter makes of the objects that are to enter the compoſition of his piece.

M. Felibien gives the general name invention to every thing that depends on the genius of the painter, as the ordonnance, the diſpoſition of the ſubject, and even the ſubject itſelf, when it is new. He alſo diſtinguiſhes invention into two kinds, that which ariſes immediately from the mind of the painter, and that which he borrows from ſome other: the firſt is when he abſolutely invents the ſubject himſelf; and the ſecond, when he borrows it from hiſtory, fable, &c.

Mr. de Piles obſerves, that invention is different from diſpoſition, and that it is thoſe two things together that form compoſition; for after having made a good choice of objects proper for the ſubject, they may be ill diſpoſed, and then, tho' the invention be ever ſo good, the diſpoſition will be faulty, and the piece will diſpleaſe.

INVENTION is alſo uſed for the diſcovery of a thing hidden. Hence,

INVENTION *of the holy croſs.* See the article *Invention of the* CROSS.

INVENTORY in law, *&c.* is a ſchedule containing all the goods and chattles of a deceaſed perſon that belonged to him at the time of his death, together with the value of the ſame, as appraiſed by two or more indifferent perſons.

Executors, as well as adminiſtrators, are to deliver in upon oath to the ordinary indented inventories, one part of which is to remain with the ordinary, and the other part with the executor or adminiſtrator. This is required for the benefit of the creditors and legatees, that the executor or adminiſtrator may not conceal any part of the perſonal eſtate from them. The ſtatute ordains, that the inventory ſhall be exhibited within three months after the perſon's deceaſe; yet it may be done afterwards, for the ordinary may diſpenſe with the time, and even with its being ever exhibited, as in caſes where the creditors are paid, and the will is executed.

INVERARY, a parliament town of Scotland, in the county of Argyle, of which it is the capital, ſituated on Lochfin, forty-five miles north-weſt of Glaſgow: weſt longitude 5°, north latitude 56° 28′.

INVERNESS, a parliament and port town of Scotland, the capital of the county of Inverneſs, ſituated at the mouth of the river Neſs: weſt long 4°, north lat. 57° 46′.

INVERSE, is applied to a manner of working the rule of three, or proportion, which ſeems to go backward, or contrary to the order of the common or direct rule. See the articles RULE OF THREE and PROPORTION.

INVERSE *method of fluxions.* See FLUXION.

INVERSION, the inverting or turning any thing backwards.

INVERSION, in grammar, is where the words of a phraſe are ranged in a manner not ſo natural as they might be.

It is a conſiderable beauty either in verſe or proſe, when we have it from an able hand; it gives vigour and variety to a ſentence, and keeps the mind in an agreeable ſuſpence and expectation of a marvellous turn and concluſion.

INVERURY, a parliament-town of Scotland, in the county of Aberdeen, ſituated on the river Don, ten miles weſt of Aberdeen.

INVESTIGATION, properly denotes the ſearching or finding any thing out by the tracts or prints of the feet; whence mathematicians, ſchoolmen, and grammarians, come to uſe the term in their reſpective reſearches.

Inveſtigation of a theme, in grammar, is the finding out the primitive tenſe, mood, and perſon of any verb, far removed from its ſource. To underſtand a greek author, it is abſolutely neceſſary to be well acquainted with the method of inveſtigating a theme. This theme, in the greek tongue, is the preſent tenſe of the indicative mood.

Clenard was the firſt who introduced this term into grammar; he gives the title *inveſtigatio thematis* to that part where he teaches the manner of finding whence any perſon or tenſe of a verb proceeds, and of reducing it to its primitive word, or finding its indicative.

INVESTITURE, in law, a giving livery of ſeiſin or poſſeſſion. There was antiently a great variety of ceremonies uſed upon inveſtitures; as at firſt they were made, by a certain form of words; and afterwards, by ſuch things as had the greateſt reſemblance to the thing to be transferred: thus where lands were intended to paſs, a turf, *&c.* was delivered by the granter to the grantee. In the church, it was cuſtomary for princes to make inveſtiture of eccleſiaſtical benefices, by delivering to the perſons they had choſen, a paſtoral ſtaff and a ring.

INULA, in botany, a genus of the ſyngeneſia-polygamia-ſuperflua claſs of plants, with radiated flowers: the receptacle is naked; the down is ſimple; and the antheræ terminate in ſetæ at their baſes.

INVOCATION, in theology, the act of adoring God, and eſpecially of addreſſing him in prayer for his aſſiſtance and protection. See the articles ADORATION and PRAYER.

The difference between the invocation of God and of the ſaints, as practiſed by the papiſts, is thus explained in the catechiſm of the council of Trent. "We "beg of God, ſays the catechiſm, to "give us good things, and to deliver us "from evil; but we pray to the ſaints,

“ to intercede with God, and obtain thoſe things which we ſtand in need of. Hence we uſe different forms in praying to God, and to the ſaints: to the former we ſay, hear us, have mercy on us; to the latter we only ſay, pray for us.” The council of Trent expreſsly teaches, that the ſaints who reign with Jeſus Chriſt, offer up their prayers to God for men, and condemn thoſe who maintain the contrary doctrine. The proteſtants reject and cenſure this practice as contrary to ſcripture, deny the truth of the fact, and think it highly unreaſonable to ſuppoſe that a limited finite being ſhould be in a manner omnipreſent, and at one and the ſame time hear and attend to the prayers that are offered to him in England, China, and Peru; and from thence infer, that if the ſaints cannot hear their requeſts, it is inconſiſtent with common ſenſe to addreſs any kind of prayer to them.

Invocation, in poetry, an addreſs at the beginning of a poem, wherein the poet calls for the aſſiſtance of ſome divinity, particularly of his muſe, or the deity of poetry.

The invocation is ſaid to be abſolutely neceſſary in an epic poem, as the poet relates things which he could not be ſuppoſed to know, unleſs he were inſpired by ſome deity. Beſides, it ſerves his readers as an example of piety, which ought to be the foundation of his whole work. Add to this, that the gods are to have a part in the action, and it is not decent he ſhould ſet them to work without firſt aſking them leave.

In the courſe of an epic poem, it is true, ſeveral invocations occur, particularly when any thing extraordinary comes to be related; as when Virgil deſcribes the metamorphoſis of Æneas's fleet into ſea nymphs: but the firſt invocation is always the moſt conſiderable.

In the invocation, Boſſu conſiders two things; the firſt is what the poet requeſts; and the ſecond, to what deity he addreſſes his requeſt. As to the firſt, Homer has ſo cloſely joined the invocation to the propoſition, that he ſeems to invoke his muſe for the whole work. Virgil, on the contrary, only requeſts his muſe to furniſh him with a part of his ſubject: he even mentions the particular part, in which he deſires her aſſiſtance; and after propoſing his matter, in all its extent, he begs the muſe to acquaint him with the cauſe of it.

As to the deity invoked, the ſame author obſerves, that it muſt always be the divinity that preſides over poetry in general, or that which preſides over the particular ſubject of the work. Ovid's invocation in his metamorphoſis, and likewiſe Lucretius's, is of this latter kind; thoſe of Homer and Virgil are of the former: they only invoke the muſes, and thus diſtinguiſh between the divinities who preſide over poetry, and thoſe who preſide over the actions of the poem, and have parts in it. Lord Shafteſbury obſerves, that an invocation appears cold from a modern poet.

INVOICE, an account in writing of the particulars of merchandiſe, with their value, cuſtom, charges, &c. tranſmitted by one merchant to another in a diſtant country.

One copy of every invoice is to be inſerted verbatim in the invoice-book, for the merchant's private uſe; and another copy muſt, immediately upon ſhipping off the goods, be diſpatched by poſt, or otherwiſe, to the correſpondent. This copy is commonly drawn out upon a ſheet of large poſt paper, to the end of which is ſubjoined a letter of advice.

It muſt here be obſerved, that when a merchant ſhips off goods for his own account, the invoice ſent to the factor contains only the quantity of goods, but nothing of the coſt and charges; and the letter ſubjoined conſiſts of inſtructions ſignifying in what manner the employer inclines to have his goods diſpoſed of, and returns made.

Invoice book, this book is paged, and contains copies of the invoices of goods ſent to ſea: for as a merchant is obliged to ſend his correſpondent an invoice of all the goods he conſigns to him, ſo it is reaſonable that he ſhould keep a copy of it for himſelf. For the further uſes of invoice-books, ſee Book *of invoices*.

INVOLUCRUM, among botaniſts, that ſort of calyx or cup, which ſurrounds a number of flowers together, every one of which has, beſides this general cup, its own particular perianthium. See the article Calyx.

The involucrum conſiſts of a number of little leaves, diſpoſed in a radiated manner.

INVOLUTION, in algebra, the raiſing of a quantity from its root to any power aſſigned. See the articles QUANTITY and POWER.

Any ſimple quantity is involved by multiplying the exponent by that of the power required: thus, to raiſe, any ſimple quantity to its ſecond, third, fourth, &c. power, is only to multiply its exponent 1, by 2, 3, 4, &c. and, in general, the power expreſſed by m, of any quantity, is had by multiplying its exponent by m. Thus, the ſecond power of a is $a^{2\times 1} = a^2$; its third power, or cube, is $a^{3\times 1} = a^3$; and the mth power of a is $a^{m\times 1} = a^m$. Alſo the ſquare of a^4 is $a^{2\times 4} = a^8$; the cube of a^4 is $a^{3\times 4} = a^{12}$; and the mth power of a^4 is $a^{4\times m}$. The ſquare of abc is $a^2 b^2 c^2$, the cube is $a^3 b^3 c^3$, and the mth power is $a^m b^m c^m$.

The coefficients muſt alſo be raiſed to the ſame power by a continual multiplication of itſelf by itſelf, as often as unit is contained in the exponent of the power required. Thus, the ſquare of $3a$ is $3 \times 3 \times a^2 = 9a^2$: and the cube of $3ab$ is $3 \times 3 \times 3 \times a^3 b^3 = 27 a^3 b^3$.

As to the ſigns, when the quantity to be involved is poſitive, it is obvious that all its powers muſt be poſitive too: and when the quantity to be involved is negative, then all its powers whoſe exponents are even numbers muſt be poſitive, and thoſe whoſe exponents are odd numbers negative; becauſe any number of multiplications of a negative, if that number be even, gives a poſitive. The power then can only be negative when its exponent is an odd number, though the quantity to be involved be negative. Thus the powers of $-a$ are $+a^2$, $-a^3$, $+a^4$, $-a^5$, $+a^6$, &c. thoſe powers whoſe exponents are 2, 4, 6, &c. being poſitive; but thoſe whoſe exponents are 1, 3, 5, &c. negative.

The involution of any compound quantity is performed by a continual multiplication of it by itſelf, as in the binomial $a+b$. Thus,

$$\begin{array}{rl}
 & a+b = \text{root} \\
\times & a+b \\
\hline
 & a^2+ab \\
 & \quad +ab+b^2 \\
\hline
 & a^2+2ab+b^2 = \text{the ſquare, or ſecond power.} \\
\times & a+b \\
\hline
 & a^3+2a^2b+ab^2 \\
 & \quad + a^2b+2ab^2+b^3 \\
\hline
 & a^3+3a^2b+3ab^2+b^3 = \text{cube, or third power.} \\
\times & a+b \\
\hline
 & a^4+3a^3b+3a^2b^2+ab^3 \\
 & \quad + a^3b+3a^2b^2+3ab^3+b^4 \\
\hline
 & a^4+4a^3b+6a^2b^2+4ab^3+b^4 = \text{biquadratic, or fourth power.} \\
\times & a+b \\
\hline
 & a^5+4a^4b+6a^3b^2+4a^2b^3+ab^4 \\
 & \quad + a^4b+4a^3b^2+6a^2b^3+4ab^4+b^5 \\
\hline
 & a^5+5a^4b+10a^3b^2+10a^2b^3+5ab^4+b^5 = \text{the fifth power.} \\
\times & a+b \\
\hline
 & a^6+5a^5b+10a^4b^2+10a^3b^3+5a^2b^4+ab^5 \\
 & \quad + a^5b+5a^4b^2+10a^3b^3+10a^2b^4+5ab^5+b^6 \\
\hline
 & a^6+6a^5b+15a^4b^2+20a^3b^3+15a^2b^4+6ab^5+b^6 = \text{ſixth power, \&c.}
\end{array}$$

If the powers of $a-b$ are required, they will be found the ſame as the preceding; only the terms, in which the exponent of b is an odd number, will be negative, becauſe an odd number of multiplications of a negative produces a negative: thus, the cube of $a-b$ will be found to be $a^3 - 3a^2b + 3ab^2 - b^3$; where the ſecond and third term are negative, the exponent of b being an odd number in theſe terms. In general, the terms of any power of $a-b$ are poſitive and negative by turns.

But the reader will find a general theorem, for raiſing a binomial to any power required, under the article BINOMIAL.

If a quantity, conſiſting of three or more terms, is to be involved, it may be diſtinguiſhed into two parts, which are to be raiſed to any power in the ſame manner as a binomial; and then, by the ſame rules, you may ſubſtitute, inſtead of the powers of theſe compound parts, their values: thus, $\overline{a+b+c}^2 = \overline{\overline{a+b}+c}^2 = \overline{a+b}^2 + 2c \times \overline{a+b} + c^2 = a^2 + 2ab + b^2 + 2ac + 2bc + c^2$. And, $\overline{a+b+c}^3 = \overline{a+b}^3 + 3c \times \overline{a+b}^2 + 3c^2 \times \overline{a+b} + c^3 = a^3 + 3a^2b + 3ab^2 + b^3 + 3a^2c + 6abc + 3b^2c + 3ac^2 + 3bc^2 + c^3$.

In theſe examples, $a+b+c$ is conſidered as compoſed of the compound part $a+b$, and the ſimple part c; and then the powers of $a+b$, are formed by the binomial theorem, and ſubſtituted for $\overline{a+b}^3$, and $\overline{a+b}^2$.

The reverſe of involution is called evolution, or the extraction of roots; that is, the finding the roots of the powers of any quantity, whether ſimple or compound. See the article EXTRACTION.

JOACHIMITES, in church-hiſtory, the diſciples of Joachim a ciſtertian monk, who was an abbot of Flora in Calabria, and a great pretender to inſpiration.

The joachimites were particularly fond of certain ternaries: the Father, they ſaid, operated from the beginning till the coming of the Son; the Son, from that time to theirs, which was the year 1260; and from that time the Holy Spirit was to operate in his turn. They alſo divided every thing relating to men, to doctrine, and the manner of living, into three claſſes, according to the three perſons in the trinity: the firſt ternary was that of men; of whom the firſt claſs was that of married men; which had laſted during the whole period of the Father; the ſecond was that of clerks, which had laſted during the time of the Son; and the laſt was that of the monks, in which there was to be an uncommon effuſion of grace by the Holy Spirit: the ſecond ternary was that of doctrine, *viz.* the Old Teſtament, the New, and the everlaſting Goſpel; the firſt they aſcribed to the Father, the ſecond to the Son, and the third to the Holy Spirit: a third ternary conſiſted in the manner of living, *viz.* under the Father, men lived according to the fleſh; under the Son, they lived according to the fleſh and the ſpirit; and under the Holy Ghoſt, they were to live according to the ſpirit only.

JOANNA, one of the iſlands of Comoro, ſituated between the north-weſt part of Madagaſcar and Zanguebar, in Africa: eaſt long. 45°, ſouth lat. 12°.

JOB, or *Book of* JOB, a canonical book of the Old Teſtament, containing a narrative of a ſeries of misfortunes which happened to a man whoſe name was Job, as a trial of his virtue and patience; together with the conferences he had with his cruel friends, on the ſubject of his misfortunes, and the manner in which he was reſtored to eaſe and happineſs. This book is filled with thoſe noble, bold, and figurative expreſſions, which conſtitute the very ſoul of poetry.

Many of the jewiſh rabbins pretend that this relation is altogether a fiction: others think it a ſimple narrative of a matter of fact, juſt as it happened: while a third ſort of critics acknowlege that the groundwork of the ſtory is true, but that it is wrote in a poetical ſtrain, and decorated with peculiar circumſtances, to render the narration more profitable and entertaining.

The time is not ſet down, in which Job lived. Some have thought that he was much antienter than Moſes, becauſe the law is never cited by Job or his friends, and becauſe it is related that Job himſelf offered ſacrifices. Some imagine that this book was wrote by himſelf; others ſay, that Job wrote it originally in ſyriac or arabic, and that Moſes tranſlated it into hebrew: but the rabbins generally pronounce Moſes to be the author of it, and many chriſtian writers are of the ſame opinion.

The worſhip of Job is of great antiquity among the Greeks and Latins: the Greeks celebrate this feſtival on May 6, and the latins keep it on the ſame month. A great number of churches and chapels are dedicated to this holy man, particularly in Spain and Italy; and he is invoked principally againſt the leproſy, the itch, the foul diſeaſe, and the like diſtempers.

JOBBER, in law, a perſon that buys and ſells cattle for others. Hence ſtock-jobbers are perſons who buy and ſell ſtocks for other perſons.

JOEL, or *the Prophecy of* JOEL, a canonical book of the Old Teſtament. Joel was the ſon of Pethuel, and the ſecond of the twelve leſſer prophets. The ſtyle of this prophet is figurative, ſtrong, and expreſſive. He upbraids the Iſraelites for their idolatry, and foretells the calamities they ſhould ſuffer, as a puniſhment of that ſin; but he endeavours to ſupport them with the comfort that their miſeries ſhould have an end, upon their reformation and repentance.

JOGUIS, among the eaſt-indians, a kind of hermits, who generally ſtand under trees, or near their pagods. Some of them go ſtark naked, holding their arms acroſs over their heads, and continue in that poſture all their lives: others lie on the ground with one leg higher than the other, and their arms raiſed above their head; and theſe wretched penitents inſenſibly loſe the uſe of their arms and legs: ſome confine themſelves in cages, ſet on the top of a thick ſtake, fixed in the ground, and theſe cages are ſo ſmall, that they put the penitent to prodigious torture: ſome holding a ſabre in one hand, and a kind of ſhield in the other, go up a kind of crane, where hooking themſelves to an iron, which runs a conſiderable way into their backs, they ſpring forward into the air, flouriſhing their ſabres, and launching out into extravagant praiſes of their idols: and others plunge into the Ganges, in hopes of being devoured by a crocodile, fancying that by this means they ſhould obtain the happineſs of the next life.

Theſe miſerable wretches are conſidered by the Indians as perfect models of piety and holineſs: they are followed by perſons of both ſexes, who make a vow of devoting themſelves to their ſervice, and are wholly employed in ſoothing their voluntary ſufferings by offering them alms and refreſhments. They call the pious to their devotions by ringing a little bell; and when they hold their ſpiritual converſations, they ſit cloſe in a ring, and ſet up a banner, made of ſeveral pieces of ſtuff, faſtened at the end of a ſtick.

JOHN, or *Goſpel of St.* JOHN, a canonical book of the New Teſtament, containing a recital of the life, actions, doctrine, and death of our Saviour Jeſus Chriſt, written by St. John the apoſtle and evangeliſt. See the article GOSPEL.

St. John wrote his Goſpel at Epheſus, after his return from the iſle of Patmos, at the deſire of the chriſtians of Aſia. St. Jerom ſays, he would not undertake it, but on condition they ſhould appoint a public faſt, to implore the aſſiſtance of God; and that the faſt being ended, St. John, filled with the Holy Ghoſt, broke out into theſe words, “In the beginning “was the word,” *&c.* The antients aſſign two reaſons for this undertaking: the firſt is, becauſe, in the other three Goſpels, there was wanting the hiſtory of the beginning of Jeſus Chriſt's preaching, till the impriſonment of John the Baptiſt; which, therefore, he applied himſelf particularly to relate. The ſecond reaſon was, in order to remove the errors of the cerinthians, ebionites, and other ſects.

St. JOHN's DAY, the name of two chriſtian feſtivals, one obſerved on June 24. kept in commemoration of the wonderful circumſtances attending the birth of St. John the Baptiſt; and the other on Dec. 27, in honour of St. John the Evangeliſt.

Chriſtians of St. JOHN. See CHRISTIANS.

St. JOHN's BREAD, *ceratonia*, in botany. See the article CERATONIA.

St. JOHN's WORT, a plant called by authors hypericum. See HYPERICUM.

Sweet JOHNS, in botany, a name ſometimes given to the pink.

St. JOHN's, in geography, one of the Philippine-iſlands, ſituated in 126° eaſt long. and 7° north lat.

St. JOHN's is alſo an iſland in the bay of St. Lawrence, ſituated north of New Scotland: weſt longitude 65°, north latitude 47°.

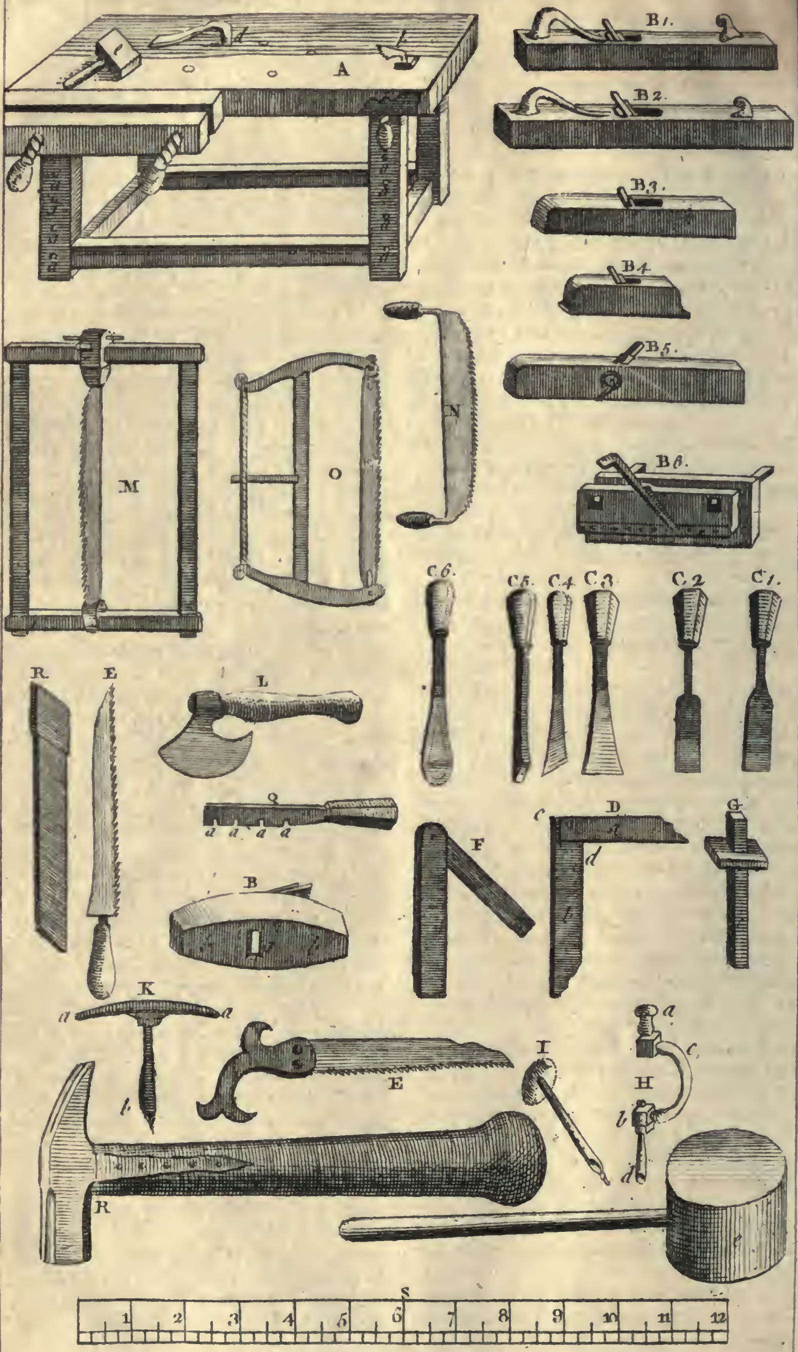
JOIGNY, a town of Champaign, in France, thirty miles ſouth-weſt of Troyes.

JOINDER, or JOYNDER, in law, ſignifies a joining of two perſons in the ſame action: as for inſtance, if there are two joint-poſſeſſors of goods, and theſe are taken from one of them, they may both join in an action to recover them. An action againſt the owner of a ſhip, on account of goods damaged, muſt be brought againſt all of them: and where there are ſeveral partners in trade, and one has the management, actions muſt be brought againſt all the partners jointly. In actions perſonal, ſeveral wrongs may be joined in one writ; yet this cannot be done where ſome things are founded on a tort, and ſome on a contract, becauſe they require a different plea and a different proceſs. However, a general action of treſpaſs, and a ſpecial action on the caſe, may be joined in one action; and any actions may be joined, in which the plea, not guilty, goes to all.

JOINERY, the art of working in wood, or of fitting various pieces of timber together.

It is called by the French *menuiſerie*, *q. d.* ſmall work, to diſtinguiſh it from carpentry,

Inſtruments uſed in JOINERY.



J Jefferys sculp

pentry, which is employed about large and leſs curious works. See the article CARPENTRY.

In the annexed plate (CXLVII.) are repreſented the tools employed in this art; where A is a work-bench; *b*, the hook; *c*, the ſcrew; *d*, the hold-faſt; *a*, *a*, *a*, holes in the legs of the bench; *e*, *e*, mallets; B, B, B, &c. planes of ſeveral ſorts; where B 1 is called a fore-plane; B 2, a jointer; B 3, a ſtrike-block; B 4, a ſmoothing-plane; B 5, a rabbet-plane; B 6, the plough: C, C, C, chiſſels of ſeveral ſorts; C 1 and C 3 being called formers; C 2, a paring-chiſſel; C 4, a ſkew-former; C 5, a morteſs-chiſſel; C 6, a gouge: D is a ſquare, *a* being called the handle; *b*, the tongue; *c*, the outer ſquare; and *d*, the inner ſquare: E, E, hand-ſaws; F, the bevil, with its tongue moveable upon a center; G, a gage; H, a piercer; *a* being its head; *b*, the pad; *c*, the ſtock; and *d*, the bit: I, a gimblet; K, an augre; *a a* being its handle; and *b*, its bit; L, a hatchet; M, a frame or bow-ſaw; N, a whip-ſaw; O, a tenant ſaw; Q, a compaſs-ſaw; R, a hammer; and S, a foot-rule, to meaſure their work with.

JOINT, in general, denotes the juncture of two or more things.

The joints of the human body are called by anatomiſts articulations. See the article ARTICULATION.

The term joint is alſo applied to the ſeparation between the ſtones or bricks of a building, uſually filled with mortar, plaſter, or cement: alſo by carpenters, to the ſeveral manners of aſſembling or fitting pieces of wood together; as a dovetail joint, &c.

Stiffneſs of the JOINTS, in ſurgery and medicine, ſometimes proceeds from the bones being broken, bruiſed, or wounded, eſpecially about the extreme parts, which being kept in one poſture, in order for cure, the ſynovia of the joints becomes thick, and depraves or quite aboliſhes its motion; or it may proceed from the bony juice proceeding from broken bones, and inſinuating itſelf into the joint. Hoffman ſays, diſeaſes of the joints ſometimes proceed from ſpaſms of the ligaments.

If difficulty of motion proceeds from long reſt, it is to be treated with emollient and reſolving fomentations, ointments, oils, and the hot fat of animals, often rubbed upon the joint; at the ſame time uſing a gentle flexure, till the motion is gradually reſtored. If theſe will not do, then warm emollient baths muſt be uſed, or hot bath-waters, till the inſpiſſated liquor is diſſolved, and the motion as much as poſſible reſtored. If it proceeds from the juice of broken bones, or the nodus gout, it is generally incurable, if the former remedies will not do.

JOINT-EXECUTORS, in law, are when two or more perſons are appointed ſuch by will; in which caſe they are accounted but as one ſingle perſon, ſo that the actions done by one of them are taken to be the acts of all, becauſe they all repreſent the perſon of the teſtator: thus, where two joint executors are poſſeſſed of a leaſe for years, in right of their teſtator, one of them may ſell the term without the others joining; and in like manner, where one joint-executor gives a releaſe, the others is bound by it, each having an authority over the whole eſtate: but a joint-executor is not charged with the acts of his companion, any farther than he is actually poſſeſſed of the goods of the teſtator; however, if joint-executors enter into an agreement, that each ſhall intermeddle with particular parts of the teſtator's eſtate, in that caſe, each becomes chargeable for the whole, by agreement. It has been held, that two joint-executors cannot plead ſeparate pleas, becauſe their teſtator, if living, on an action brought againſt him, could have been allowed but one plea; and that if all the executors are not named in an action brought by joint executors, the action will abate. As to legatees, the receipt of one executor charges not the other.

JOINT LIVES, in law, is where any thing is granted or given to two or more during their lives.

JOINT-TENANTS, are ſuch as hold lands or tenements jointly by one title; as where a man grants lands, &c. to two perſons and their heirs; ſuch perſons, during their joint tenancy, muſt jointly plead, as well as be jointly ſued, which is common to them with coparcenars of lands. See the article COPARCENARS.

Every joint-tenant in an eſtate has a right to his own ſhare, and may give leaſe or forfeit the ſame; he may make a leaſe, but not a deed of feoffment, or grant, to any beſides his companion. Joint-tenants cannot ſingly diſpoſe of more than the part that belongs to them; for where they join in any gift or grant of lands, in the judgment of the law, each gives but his reſpective part: therefore, if one joint-tenant grants a rent-charge out of his part, after his death the ſurvivor ſhall have the whole land diſcharged, becauſe the land will be his by ſurvivorſhip: but where a leaſe for years is made by a joint-tenant, it cannot be avoided by the ſurvivor. Sometimes joint-tenants enter into covenants, not to take advantage of each other by ſurvivorſhip; and, indeed, they, as well as tenants in common of inheritance, are bound by ſtatute to make partition, in the ſame manner as coparcenars.

JOINTURE, in law, generally ſignifies a ſettlement of lands and tenements, made on a woman in conſideration of marriage. See the article MARRIAGE.

It alſo ſignifies a covenant, by which the huſband, or ſome friends of his, aſſures lands, &c. to his wife for the term of her life. See the article ANNUITY.

Here it is obſervable, that an eſtate ſettled in jointure, which comes from the anceſtors of the wife, and is not of the purchaſe of the huſband, or ſome anceſtor of his, will not be accounted a good jointure. Where no eſtate of inheritance is reſerved to the huſband and his heirs, but the eſtate is granted to the wife for life, or in tail, the remainder to a ſtranger; this will not be a legal jointure, although the ſame is made by the huſband or his anceſtor.

In order to make a perfect jointure agreeable to the ſtatute 27 Hen. VIII. cap. x. ſeveral things are to be obſerved: 1. That it be made to take effect for the wife's life, either in poſſeſſion or profit, preſently after the deceaſe of her huſband. 2. That it be for the term of her own life, or for a greater eſtate: it may however be limited to continue no longer than ſhe remains a widow, &c. 3. That it be expreſſed to be in ſatisfaction of her whole dower, and not a part thereof. 4. That, though it may be made either before or after marriage, yet, if before, the wife cannot wave it, and claim her dower at common law: but if made afterwards, ſhe may, at the death of her huſband. It is here ſaid, that all other ſettlements in lieu of jointures, that are not purſuant to this ſtatute, are jointures at common law, and no bars to claim of dower. See DOWER.

Upon the huſband's death, the wife may enter on her jointure, and is not driven to a real action, as ſhe is to recover dower at common law. Wherefore, on a lawful eviction of her jointure, ſhe ſhall be endowed according to the rate of her huſband's lands, of which ſhe was entitled to dower by the common law; and ſhould ſhe be evicted of part of her jointure, ſhe ſhall have dower for ſo much thereof. A huſband committing treaſon ſhall not occaſion a forfeiture of the wife's jointure; yet feme-coverts committing the ſame, or felony, are liable to forfeit their jointures; and upon conviction of recuſancy, they incur the forfeiture of two parts of three in their jointures, as well as dowers.

JOINTURESS, or JOINTRESS, the perſon on whom a jointure is ſettled. See the preceding article.

Where an eſtate, ſettled on a wife, is a jointure by law, and the jointreſs makes any alienation thereof, either by fine, feoffment, &c. with another huſband, ſuch alienation ſhall be a forfeiture of the eſtate ſo ſettled, as a jointure: but a jointreſs may, by leaſe, demiſe and grant an eſtate for forty years, &c. if ſhe live ſo long; or for life, without incurring a forfeiture. In caſe the jointreſs covinouſly ſuffers a recovery to bar the heir, he may enter preſently upon the lands, &c.

JOINVILLE, a town of Champaign, in France, ſituated on the river Marne: eaſt longitude 5° 15′, and north latitude 48° 27′.

JOISTS, or JOYSTS, in architecture, thoſe pieces of timber framed into the girders and ſummers, on which the boards of the floor are laid.

Joiſts are from ſix to eight inches ſquare, and ought ſeldom to lie at a greater diſtance from each other than ten, or, at moſt, twelve inches, nor ought they ever to bear a greater length than ten feet, or to be leſs into the wall than eight inches. All joiſts on the back of a chimney ought to be laid with a trimmer, at ſix inches diſtance from the back.

Some carpenters furr their joiſts, as they call it; that is, they lay two rows of joiſts, one over another, the undermoſt of which are framed level with the under ſide of the girder; and the uppermoſt, which lie croſs the lower ones, lie level with the upper ſide of the girder.

JONAH, or *Prophecy of* JONAH, a canonical book of the Old Teſtament, in which it is related, that Jonah was ordered to go and prophecy the deſtruction of the Ninevites; but that diſobediently attempting a voyage another way, he was diſcovered by the riſing of a ſudden tempeſt, and caſt into the ſea, where he was ſwallowed up by a whale, which having lodged him three days and three nights in his belly, diſgorged him upon the ſhore; whereupon being ſenſible of his paſt danger and ſurpriſing deliverance, he

Fig. 1. IONIC ORDER.

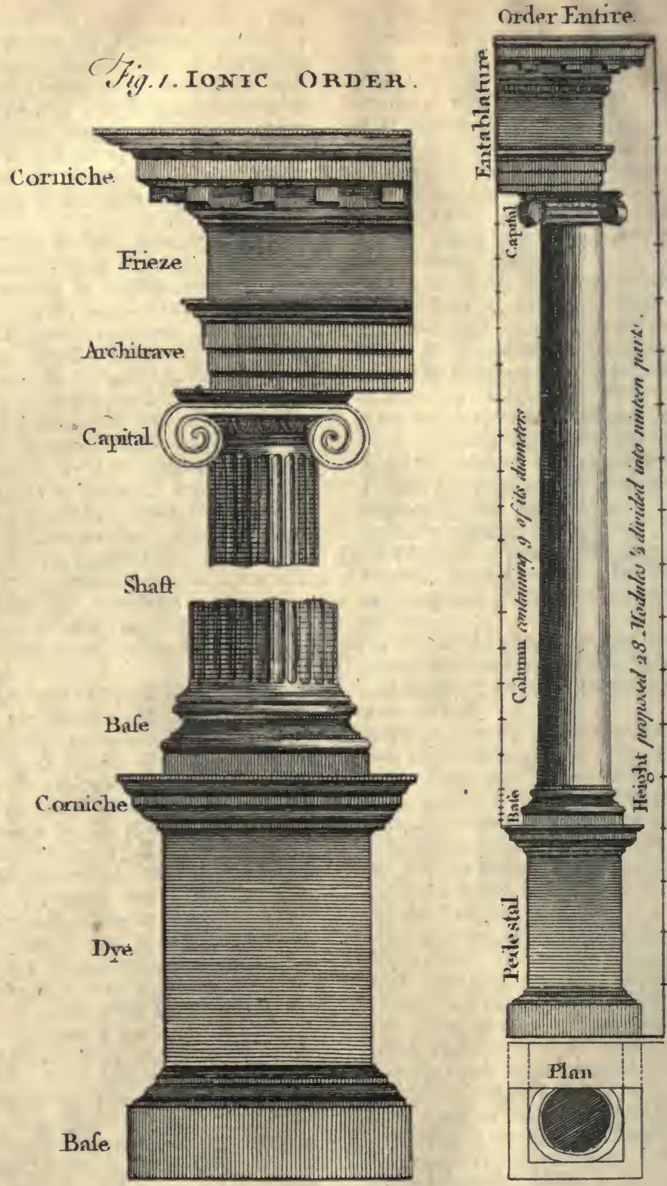


Fig. 2 ISOSCELES.

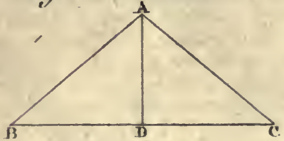
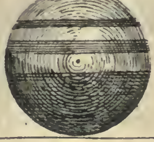


Fig. 3 JUPITER.



T. Jefferys sculp

betook himſelf to the journey and embaſſy, to which he was appointed; and arriving at Nineveh, the metropolis of Aſſyria, he, according to his commiſſion, boldly laid open to the inhabitants, their ſins and miſcarriages, and proclaimed their ſudden overthrow; upon which the whole city, by prayer and faſting, and a ſpeedy repentance, happily averted the divine vengeance, and eſcaped the threatened ruin.

IONIA antien[illegible] was a province of the leſſer Aſia, or Natolia, bounded by Etolia on the north, Lydia on the eaſt, Caria on the ſouth, and the Archipelago on the weſt.

IONIC ORDER, the third of the five orders of architecture, being a kind of mean between the robuſt and delicate orders. See plate CXLVIII. fig. 1.

The firſt idea of this order was given by the people of Ionia, who, according to Vitruvius, formed it on the model of a young woman of an elegant ſhape, dreſſed in her hair; whereas the doric had been formed on the model of a ſtrong robuſt man. The ionic order is diſtinguiſhed from the compoſite, in that it has none of the acanthus-leaves in its capital; and from the tuſcan and doric, by the channels and flutings in its ſhaft.

The capital of this order is adorned with volutes, and its corniche with dentiles. The proportions of the ionic pillar, as they are taken from the famous one in the temple of Fortuna Virilis at Rome, now the church of St. Mary the Egyptian, are theſe: 1. The entire order from the ſuperficies of the area to the corniche, are twenty-two modules, or eleven diameters. 2. The column with its baſe contains eighteen modules. 3. The entablature contains four modules. 4. The volute of the capital is of an oval form. 5. The columns in this order are often hollowed, and furrowed with twenty-four gutters or channels, called flutings: theſe flutings are not always concave from the top of the ſhaft to the bottom, but for that third of it next the baſe, they are filled up with a kind of rods or canes; and in the other two thirds they are left hollow, or ſtriated, in imitation of the folds or plaits of a garment.

When this order was firſt invented, its height was but ſixteen modules; but the antients, to render it ſtill more beautiful than the doric, augmented its height, by adding a baſe to it.

Mr. Le Clerc makes its entablement four modules and ten minutes, and its pedeſtal ſix entire modules; ſo that the whole order makes twenty-eight modules ten minutes.

This order is at preſent uſed properly in churches and religious houſes, courts of juſtice, and other places of tranquility and devotion.

This order has one advantage above any of the reſt, which conſiſts in this, that the fore and hind parts of its capital are different from its ſides; but this is attended with an inconvenience, when the ordonnance is to turn from the front of the building to the ſide; to obviate which, the capital may be made angular, as is done in the temple of Fortuna Virilis.

Scamozzi, and ſome other modern architects, have introduced the upper part of the compoſite capital, in lieu of the ionic, imitating that of the temple of Concord, whoſe four ſides are alike. To render it a little more beautiful, the volute may be made a little oval and inclining.

For the baſe, corniche, freeze, and pedeſtal of this order, ſee the articles BASE, CORNICHE, &c.

IONIC DIALECT, in grammar, a manner of ſpeaking peculiar to the people of Ionia. At firſt it was the ſame with the antient attic; but paſſing into Aſia, it did not arrive at that delicacy and perfection to which the athenians attained. The Ionians generally changed the α into η, as σοφια into σοφιη: they put the η and ι for ε, and αιη for η, as αγγηϊον for αγγειον: αναγκαιη for αναγκη: they alſo change α and ει into ηϊ, αυ into αϋ, ει into εα and εε, ευ into ω and ηϋ, and εο into ευ, as ρᾳδιος into ρηΐδιος, αληθεια into αληθηΐη, θαυμα into θωῦμα, αυλος into ωυλος, ποιεισθαι into ποιεεσθαι, ημεις into ημεες, &c. they alſo inſert the ι and υ, as ξεινος for ξενος, and πουλυς for πολυς.

IONIC SECT was the firſt of the antient ſects of philoſophers; the others were the italic and eleatic. The founder of this ſect was Thales, who being a native of Miletus in Ionia, occaſioned his followers to aſſume the appellation of ionic: Thales was ſucceeded by Anaximander, and he by Anaximenes, both of Miletus; Anaxagoras Clazomenius ſucceeded them, and removed his ſchool from Aſia to Athens, where Socrates was his ſcholar. It was the diſtinguiſhing tenet of this ſect that water was the principle of all natural things.

IONIC TRANSMIGRATION was antiently a very celebrated epocha; it took its riſe from the retreat of the athenian colonies, who, upon the death of Codrus, put themſelves under the command of his ſon Neleus, and eſtabliſhed the twelve cities of Ionia in Aſia. Theſe colonies, according to Eratoſthenes, were eſtabliſhed 50 years after the return of the Heraclidæ; and, according to Marſham, 77 years after the taking of Troy.

JOVIAL, *jovialis*, among chemiſts, *&c.* ſomething belonging to tin, as the bezoardicum joviale. See the articles BEZOARDICUM and TIN.

JONK, or JONQUE, in naval affairs, is a kind of ſmall ſhip, very common in the Eaſt-indies: theſe veſſels are about the bigneſs of our fly boats; and differ in the form of their building, according to the different methods of naval architecture uſed by the nations to which they belong. Their ſails are frequently made of mats, and their anchors are made of wood.

JOSHUA, a canonical book of the Old Teſtament, containing a hiſtory of the wars and tranſactions of the perſon whoſe name it bears. This book may be divided into three parts; the firſt of which is a hiſtory of the conqueſt of the land of Canaan; the ſecond, which begins at the twelfth chapter, is a deſcription of that country, and the diviſion of it among the tribes; and the third, compriſed in the two laſt chapters, contains the renewal of the covenant he cauſed the Iſraelites to make, and the death of their victorious leader and governor. The whole comprehends a term of ſeventeen, or, according to others, of twenty-ſeven years.

JOURNAL, a day-book, regiſter, or account of what paſſes daily.

JOURNAL, or DAY BOOK, among merchants, is that wherein the tranſactions, recorded in the waſte-book, are prepared to be carried to the ledger, by having their proper debtors and creditors aſcertained and pointed out, for a more diſtinct account of which, ſee BOOK.

JOURNAL, at ſea, is a regiſter, kept by the pilot and others, wherein notice is taken of every thing that happens to the ſhip from day to day, with regard to the winds, the rhumbs, the rake, ſoundings, *&c.* and in order to enable him to adjuſt the reckoning, and determine the place where the ſhip is.

For the method of correcting a journal at ſea, by making proper allowances for the lee-way, variation, *&c.* ſee LEE-WAY, VARIATION, RECKONING, *&c.*

The remarkable occurrences of the whole day being finiſhed in the log-book, if the latitude by account agree with the latitude by obſervation, the ſhip's place will be truly determined; if not, then the reckoning muſt be corrected, before it be placed in the journal. See LOG-BOOK. The form of the journal, together with an example of two days work, is as follows. N. B. To expreſs the days of the week the ſeamen commonly uſe in their books the characters by which the ſun and planets are expreſſed, *viz.* ☉ denoting Sunday, ☽ Monday, ♂ Tueſday, ☿ Wedneſday, ♃ Thurſday, ♀ Friday, and ♄ Saturday.

A Journal from the Lizard towards Jamaica, in the ſhip Neptune, J. M. commander.

Week Days.	Months. Years.	Month Days.	Winds.	Direct Courſe.	Miles. Diſt.	Latitude correct.	Whole diff. Lon. made.	Bearings and diſt. from the Lizard.	Remarkable obſervations and accidents.
☽			N b E E b S N N E E N E N E b E	S31,31W	157.4	47°, 46′	2°, 5′ W	At noon the Lizard bore N 31°, 31′ E diſt. 157.4 Miles.	Fair weather at four P. M. I took my departure from the Lizard, bearing N N E, diſtance five leagues.
♂			Weſt N W b W S W b W	S 34, 10 E	48, 2	47°, 06′	1°, 35′ W	At noon the Lizard bore S 17°, 55′ W diſt. 183 Miles	Strong gales of wind and variable.

Journal is alſo a name common for weekly eſſays, news-papers, &c. as the Gray's Inn Journal, the Weſtminſter Journal, &c.

JOURNEYMAN, properly one who works by the day only; but it is now uſed for any one who works under a maſter, either by the day, the year, or the piece.

JOURNEYS-accounts, in law, ſignifies as ſoon as poſſible: thus, when a writ is rendered void by the death of the defendant, or for want of form, &c. the plaintiff becomes entitled to have a new writ by journeys-accounts, that is, within as little time as he poſſibly can, after the abatement of the firſt; in which caſe, the ſecond writ is a continuance of the cauſe, as much as if the firſt writ had never abated. This ſecond writ is to be brought within fifteen days at moſt, after the abatement of the firſt, which muſt have been without any fault of the plaintiff, otherwiſe a ſecond writ cannot be brought by journeys-accounts: yet if the abatement be by default of the clerk, in not writing the writ in due form, the plaintiff may have it. The ſecond writ muſt be brought for the ſame thing, and alſo in the ſame court as the firſt. This is to be obſerved, that judicial writs can never be had by journeys-accounts.

JOYNERY, or Joinery. See Joinery.

JOZO, in ichthyology, the gobius with the ventral-fins blue, and the rays of the back-fin aſſurgent. See Gobius.

This fiſh grows to ſix or eight inches in length, and to about an inch in diameter; the head is thick but ſomewhat compreſſed, the body rounded, the eyes large, and their iris of a ſilvery white.

IPECACUANHA, in the materia medica, a weſt-indian root, of which there are two kinds, diſtinguiſhed by their colour, and brought from different places, but both poſſeſſing the ſame virtues, though in a different degree. The one is grey, and brought from Peru; the other is brown, and is brought from the Brazils: and theſe are indifferently ſent into Europe under the general name of ipecacuanha.

Theſe two ſorts have been by ſome ſuppoſed to be the roots of two different plants, but this is a miſtake; the only difference is, that one grows in a different place, and in a richer and moiſter ſoil, and is better ſupplied with juices than the other.

The grey ipecacuanha ought to be choſen for medicinal juices, preferable to the brown, as the latter is apt to operate more roughly. The peruvian, or grey, ipecacuanha is a ſmall and irregularly contorted and twiſted root; it is of the thickneſs of a gooſe-quill, and riſes into a ſort of annular ridges, running quite round the root. It is conſiderably hard, and does not cut eaſily through with the knife; but on bending it much, it eaſily breaks. It is of a duſky greyiſh colour on the ſurface, and when broken appears of a clearer and paler grey, and diſcovers a tough and firm nerve, occupying its center, and running its whole length. The whole root is of a peculiar and ſomewhat pungent ſmell; in taſte it is acrid and ſomewhat bitteriſh, and upon the whole very diſagreeable.

The brown, or braſilian, ipecacuanha reſembles the other, but is more twiſted and convoluted; it is a ſmaller and ſhorter root, of a deep duſky brown on the outſide, and white when broken: it is leſs acrid and more bitter than the grey-kind.

The grey and brown are both of them ſo acrimonious, that the people employed to pound any quantity of either, if they have not the caution very carefully to avoid the duſt that ariſes from the mortar, are often ſeized immediately afterwards with a difficulty of breathing, and ſpitting of blood, and ſometimes with bleeding at the noſe, and a great ſwelling and inflammation of the face, eyes, and throat; theſe ſymptoms generally go off in a day or two of themſelves; but if they are more than ordinary violent, it may be proper to bleed for them.

Ipecacuanha, however, is an excellent, mild, and ſafe emetic; it is alſo a noble reſtringent; and given in doſes too ſmall to vomit, is the greateſt of all remedies for a dyſentery. Its doſe, as an emetic is from ſix or eight to thirty grains, and the beſt way of taking it is in white wine, in which it ſhould have firſt ſtood four and twenty hours. In dyſenteries the patient is firſt to take ſuch doſes of it as will vomit him, and afterwards to continue the uſe of it for a long time, at the rate of three or four grains, in any form, twice a day. Small doſes of ipecacuanha, are an excellent remedy in diarrhœas of a more ſimple kind; and in the fluor albus, we hardly know a better medicine.

IPECU, or the *Braſilian* Wood Pecker, in ornithology, a ſpecies of picus, with a ſcarlet creſted head. See the articles Picus and Wood Pecker.

IPOMÆA, AMERICAN JASMINE, in botany, a genus of the pentandria-monogynia claſs of plants, the corolla whereof conſiſts of a ſingle infundibuliform petal; the tube is nearly cylindric, and very long; the limb is patent, and divided into five ſemi-lanceolated plane ſegments; the fruit is a roundiſh capſule, containing three cells; the ſeeds, of which there are ſeveral in each cell, are of an oval figure. This plant is by ſome reckoned a ſpecies of the convolvulus. See plate CXLIV. fig. 4.

IPSWICH, a borough and port-town of Suffolk, ſituated on the river Orwel, twenty-four miles ſouth eaſt of Bury.

It ſends two members to parliament.

IRBIL, or ARBELA, a town ſituated on the river Lycus, in a fine plain in the province of Aſſyria, now Curdeſtan, eaſt long. 44°, north lat. 35° 15′, where Alexander fought the third and laſt deciſive battle with Darius.

IRELAND, an iſland of the Atlantic ocean, ſubject to Great Britain, ſituated between 5° and 10° weſt long. and between 51° and 56° north latitude; being bounded by the Northern ocean on the north, by St. George's channel, which divides it from Great Britain, on the eaſt, and by the Atlantic and Weſtern ocean on the ſouth and weſt. This country is two hundred and fifty miles long, and one hundred and fifty broad; diſtant from Holyhead, in north Wales, fifty miles, and from Galloway, in Scotland, fifteen miles. It is divided into four large provinces, *viz.* Ulſter on the north, Leinſter on the eaſt, Munſter on the ſouth, and Connaught on the weſt.

IRIS, the RAINBOW, in phyſiology. See the article RAINBOW.

IRIS, in anatomy, the anterior coloured part of the uvea of the eye. See EYE.

The iris is a circular variouſly coloured part, which ſurrounds the pupil; it is in ſome perſons blue, in others black, brown, grey, &c. each of which has its peculiar beauty, and is ſuited to the complexion of the perſon who has it.

IRIS, the FLOWER DE LUCE, in botany, a genus of the triandria-monogynia claſs of plants, under which is comprehended the xiphion, ſiſyrinchium, and hermodactylus of authors, the characters of which are theſe: the flower is monopetalous, but divided into ſix long and obtuſe ſegments; the three exterior ones being reflex, or bent back, and the three inner ones erect and more acute; the fruit is an oblong, angular, and trilocular capſule, containing a great number of ſeeds. See plate CXLIV. fig. 5.

The florentine, or dry iris-root, is an attenuant and expectorant, and accordingly given with ſucceſs in aſthmas and diſorders of the breaſt and lungs; the doſe is from ten to fifteen grains in powder. The juice of the freſh root of our common iris is an excellent medicine in dropſies; and the beſt way of giving it is in white wine, an ounce or two for a doſe: it works both by vomit and ſtool, and carries off a very great quantity of phlegm. It is alſo ordered as a ſternutatory, to be ſnuffed up the noſe, in complaints of the head, which it eaſes very much, by bringing away the over-abundant phlegm.

IRIS, or RAINBOW CRYSTAL, in the hiſtory of foſſils, is the whitiſh ellipomacroſtylum, with a very long pyramid. See ELLIPOMACROSTYLA.

IRON, *ferrum*, in natural hiſtory, the lighteſt of all metals excepting tin, but conſiderably the hardeſt of them all.

It is, when pure, naturally malleable and ductile under the hammer; but that in a leſs degree than either gold, ſilver, lead, or copper. When wrought into ſteel, or when in the impure ſtate from its firſt fuſion, in which it is called caſt iron, it is ſcarce malleable at all: the moſt ductile iron in the world alſo, on being only heated and ſuddenly quenched in cold water, loſes much of this quality.

Iron is extremely capable of ruſt; more ſo than any other metal; it is very ſonorous; it requires the ſtrongeſt fire of all the metals to melt it; it muſt be a very good furnace that will make iron run without the blaſt of bellows; but it is found, when once heated to a proper degree, this blaſt will effect that without the aſſiſtance of the farther heat of any fuel being employed in it; for if an iron-bullet, made red-hot, be ſuſpended at a diſtance from the fire, and the blaſt of a ſtrong pair of bellows forcibly directed againſt it in that condition, it will in a little time melt and run down in drops, by the mere effect of the current of the air they convey to it. Iron is leſs ſimple in its compoſition than any of the heavier metals: it contains, indeed, a ſulphur ſo imperfectly blended with the reſt of its conſtituent matter, that it will readily get looſe from it, and in a ſtrong heat will appear in viſible flames. It is the moſt difficult of all the metals to be amalgamated with mercury; the metallurgic authors in general, have ſaid that it will not amalgamate with it at all; but, from the ſucceſs of ſome late attempts towards making this union between them, it appears to be not impoſſible, that a method may be found of doing it.

Iron is leſs fixed in the fire, than moſt of the other metals; it manifeſtly fumes and ſparkles, when expoſed to a moderately fierce degree of it; it loſes alſo a part of its weight in the heat, and much more when in fuſion. Iron is remarkable for the effect fire has on it, in rendering it more ductile; moſt of the other metals are brittle, while they are hot; but this is moſt of all malleable, as it approaches neareſt to fuſion. It grows red-hot long before it melts, and is known to be approaching towards that ſtate, by its becoming whiter, and by its ſparkling: if taken from the fire, as ſoon as it runs, it is found to be more malleable for the fuſion; but if it be kept long in that ſtate, its ſulphur diſſipates in form of a white ſmoke; the metal after this becomes much more brittle, and in fine runs into a bluiſh glaſs.

Iron, expoſed to the focus of a great burning glaſs, inſtantly grows red-hot, then turns whitiſh, ſparkles and flames, and immediately after melts; ſoon after this the greateſt part of it flies off in ſparks, which appear very bright, and, if caught upon paper, are found to be ſo many little globular bodies, all hollow like bomb-ſhells: the remainder runs into a bluiſh or purpliſh glaſs; and this glaſs, expoſed again to the ſame focus, on a piece of charcoal, takes up, from the vegetable fuel, the ſulphur or inflammable principle it had loſt, and becomes true iron again. Upon the whole, the effects of a common, and thoſe of a ſolar fire, on this body, concur to prove, that it conſiſts of vitriolic ſalt, a vitrifiable earth, and a peculiar bituminous matter, not found in any of the other metals. When perfectly pure, it readily melts with gold and ſilver, and unites with them in fuſion; but if it be impure, it ſeparates itſelf, and forms a diſtinct regulus above the ſurface of the other.

On being heated red-hot, it increaſes in bulk and in weight; but it returns to its former gravity and dimenſions when cold.

Iron is ſoluble in all the ſtronger acids; ſpirit of nitre, or aqua fortis, ſucceed moſt readily in the ſolution of it; but, beſide theſe, and all the other acids, it is to be diſſolved alſo by a multitude of weaker menſtruums, among the reſt even by common water; for on lying long in this fluid, it communicates a manifeſt taſte to it, and contracts a ruſt, and throws off a yellow ochre. All ſalts, except the alkaline ones, readily diſſolve iron; nay the very air has ſo much power over it in this reſpect, that the people who deal in utenſils made of it, are obliged to cover them with ſome oily or fat ſubſtance, to make them retain their poliſh. To this may be added, that iron is the moſt eaſily of all metals deſtroyed by many other means: it neither reſiſts the force of lead nor of antimony; but, on being fuſed with them, it almoſt immediately vitrifies, and is carried off in form of ſcoriæ.

The great teſt of iron, is its anſwering to, or being attracted by, the magnet or loadſtone; but then it muſt be in its true metalline ſtate, for many of its ores will not anſwer in any part to this trial. Experiments, however, prove, that iron may be produced by art, out of almoſt every thing we know. Earths of almoſt all kinds afford iron by calcination; and all the parts of animals and vegetables, as well their fluids as their ſolids, yield it by the ſame means: if any plant, or part, or juice of a plant, be burnt to aſhes, or the fleſh, bones, blood, or fat of any animal, be treated in the ſame manner, iron will be found in the aſhes, and that in ſo perfect a ſtate, that it anſwers readily to the magnet. Honey, wax, and all other vegetable ſubſtances, collected by animals, contain iron, and it may ſeparated from them pure, in the ſame manner: finally, our Dr. Liſter takes great pains to prove, that this metal is found in, nay, and is the baſis of the ſtone in the bladder.

Iron in the bowels of the earth, when it enters the compoſition of cryſtals and ſpars, ſeems to be two very different operations of the ſame metal; they ſometimes concur, as there are found purple rhombic cryſtals of iron, and yellow cubic ones of lead; but in general it is much more frequent to be coloured hexangular ſprigs, and colourleſs cubes and rhombs.

Among the gems, the amethyſt, garnet, and hyacinth owe their colours to iron; and this metal has the ſame effect in the preparation of the factitious gems, as in the natural ones; for, properly managed, it communicates a purple or red colour in various ſhades and degrees, to glaſſes and to vitrified ſubſtances of all kinds. True native iron is not to be expected in the midſt of maſſes of its ore, but in detached ſprigs or filaments in the fiſſures of rocks, the whole ſubſtance of which is rich in that metal: ſuch have been all the genuine ſpecimens of this rich foſſil, and ſuch their place of formation.

The ores of iron generally diſcover themſelves to be ſuch, either by their reſemblance to wrought iron in ſtructure and look, or by the yellowiſh or purpliſh tinge they are coloured with. Thoſe which have moſt of all the appearance of the metal they contain, are uſually the richeſt. There is an iron-ore found in Sweden and Germany, particularly in the Harts-foreſt, which uſually lies in the largeſt fiſſures of the ſtrata, in great lumps, and is very hard, heavy, and of a bluiſh grey colour; this, when broken, has ſo much of the ſparkling appearance of the metal, that a perſon unaccuſtomed to theſe ſubjects, might eaſily miſtake it for real pure iron. This is the richeſt iron-ore known, unleſs we except ſome of the hæmatites. We have an ore very like this in the foreſt of Dean, in Gloceſterſhire, which is at this time worked to great advantage. Another kind we have in Derbyſhire, which is alſo common to Sweden and to Germany; it reſembles the former, but that it is harder; and when broken, it is not ſo bright and ſparkling. There are alſo other very rich ores of a duſky brown colour, with a tinge of purple; of this kind are thoſe worked at this time in Suſſex, under the name of the cabala-vein. Another of the rich kinds, leſs common with us, is of a bluiſh purple, with a few bright ſpangles in it; but this is much inferior to the two former of thoſe above-mentioned.

The poorer ores of iron are generally of a more lax and friable texture, and of a yellowiſh or reddiſh hue, or elſe of a mixed colour between theſe, and with a caſt of browniſh or blackiſh in it: but the moſt ſingular of all the ores of iron is a white one, which appears only like a debaſed cryſtal, having not the leaſt ſign of metal in it. The common ochres, as well the yellow as the red, are alſo to be ranked among the number of the ores of iron; they are very rich in that metal, and are even worked for it in ſome places to great advantage; nor are we to omit the mention of thoſe elegant bodies which hang from the roofs of caverns in iron-mines, in form of icicles; theſe are truly ſtalactites of iron; they are generally produced in large cluſters together, and called by the miners bruſh-ore: theſe are almoſt all iron. The cruſtated ferrugineous bodies, common in our gravel-pits about London, are alſo very rich in iron, and have been worked for it in places where they are ſufficiently plentiful. The red ſubſtance called ſmit, is likewiſe a very rich iron-ore; this is much like the common Derbyſhire reddle, but finer and heavier.

Method of obtaining IRON *from its ore, in a cloſe veſſel.* Roaſt for a few minutes in a teſt under the muffel, and with a pretty ſtrong fire, two centners of the ſmall weight of your iron-ore groſly pulveriſed, that the volatiles may be diſſipated in part, and the ore itſelf be ſoftened, in caſe it ſhould be too hard. When it is grown cold, beat it extremely fine, and roaſt it a ſecond time, as you do the copper-ore, but in a much ſtronger fire, till it no longer emits any ſmell; then let it grow cold again.

Compoſe a flux of three parts of the white flux with one part of the fuſible pulveriſed glaſs, or of the like ſterile unſulphureous ſcoriæ, and add glaſs gall and coal-duſt, of each one half part: add of this flux three times the quantity of your roaſted ore, and mix the whole very well together: then chooſe a very good crucible, well rubbed with lute within, to ſtop the pores, which may be here and there unſeen; put into it your ore mixed with the flux, cover it over with common ſalt, and ſhut it cloſe with a tile, and with lute applied to the joints.

Put the wind-furnace upon its bottom part, having a bed made of coal-duſt; introduce beſide into the furnace, a ſmall grate, ſupported on its iron-bars, and a ſtone upon it, on which the crucible may ſtand as upon a ſupport; ſurround the whole with hard coals, not very large, and light them at top; when the veſſel begins to grow red, which is indicated by the common ſalt's ceaſing to crackle, ſtop with groſs lute, or windſor-loam, the holes of the bottom part, except that in which the nozzle of the bellows is received; blow the fire, and excite it with great force, adding now and then freſh fuel, that the veſſel may never be naked at top. Having thus continued your fire in its full ſtrength for three quarters of an hour, or a whole hour, take the veſſel out of it, and ſtrike the pavement on which it is ſet, that the ſmall grains of iron that happen to be diſperſed, may be collected into a regulus, which you will find after having broken the veſſel.

Preparations of IRON, in medicine, are,

1. The crude filings, reduced to an impalpable powder, greatly recommended in female diſorders.

2. The crocus martis. See CROCUS.

3. The flores martiales, or flowers of iron. See the article FLOS.

4. The ſal martis, or ſalt of iron, which is prepared thus: mix together a quart of water, and eight ounces of the oil of vitriol; pour the oil of vitriol in by a little at a time; put the mixed liquor into a glaſs-veſſel, and add to it four ounces of the filings of iron: when the ebullition is over, evaporate the liquor to a pellicle, and ſet it to ſhoot, there will then be a green vitriol or ſalt found in fair cryſtals; dry them for uſe.

This ſalt is one of the moſt powerful preparations of this metal; it opens obſtructions of all kinds, ſtrengthens the viſcera, is an excellent medicine in cachexies, and deſtroys worms.

5. Tincture of iron, with ſpirit of ſalt, is made thus: take filings of iron, half a pound; Glauber's ſpirit of ſea-ſalt, three pounds; rectified ſpirit of wine, three pints: digeſt the ſpirit of ſalt and the filings together, without heat, as long as the ſpirit will work upon them; then after the fæces have ſubſided, pour off the clear liquor, evaporate it to one pound, and to this add the ſpirit of wine.

This has the ſame virtue as the crocus martis. See the article CROCUS.

6. Chalybeate, or ſteel wine, is made in the following manner: take filings of iron, four ounces; cinnamon and mace, of each half an ounce; of rheniſh wine, two quarts; infuſe them a month, without heat, often ſhaking the veſſel, and then filter it off for uſe.

This wine is an excellent ſtomachic and aperient; a moderate glaſs may be drank once or twice a day, or it may be mixed in apozems of the aperient vegetables.

Duties upon IRON. Any ſpaniſh, ſpruce, and ſwediſh iron imported in any other ſhip or veſſel than ſuch as is engliſh built, and of which the maſter, and at leaſt three-fourths of the mariners are engliſh, pays on importation, 2l. 17s. 10$\frac{65}{100}$d. the ton, and draws back on exportation, 2 l. 14 s. 6$\frac{75}{100}$d. the ſame imported in engliſh-built ſhips, and ſo navigated, to pay on importation, 2 l. 8 s. 6$\frac{15}{100}$d. the ton, and draw back on exportation, 2 l. 5 s. 2$\frac{25}{100}$d. Iron ſlit or hammered into rods, commonly known by the name of rod-iron, pays on importation, 8s. 6$\frac{45}{100}$d. the hundred wt. and draws back on exportation, 8 s. $\frac{75}{100}$d. Ditto from Ireland, pays 3 s. 10$\frac{20}{100}$d. and draws back, 3 s. 4$\frac{50}{100}$d. Iron drawn or hammered, leſs than three fourths of an inch ſquare, pays on importation, 8 s. 6$\frac{45}{100}$d. the hundred weight, and draws back on exportation, 8 s. $\frac{75}{100}$d. Unwrought iron of Ireland, pays on importation, 1l. 6s. 11$\frac{40}{100}$d. the ton, and draws back on exportation, 1 l. 3 s. 7$\frac{50}{100}$d. Unwrought iron of all other places, not otherwiſe rated, imported in britiſh ſhips, pays on importation, 2 l. 8 s. 6$\frac{15}{100}$d. the ton, and draws back on exportation, 2 l. 5 s. 2$\frac{25}{100}$d. and in foreign ſhips, pays on importation, 2 l. 17 s. 10$\frac{65}{100}$d. and draws back on exportation, 2 l. 14 s. 6$\frac{75}{100}$d. Iron-wares manufactured, not otherwiſe rated, or not prohibited by law, pay per hundred weight on importation, 12 s. 4$\frac{65}{100}$d. and draw back on exportation, 11 s. 5$\frac{25}{100}$d. Iron-ore the ton, pays on importation, 2 s. 4$\frac{72\frac{1}{2}}{100}$d. and draws back on exportation, 2 s. 1$\frac{87\frac{1}{2}}{100}$d. Old buſhels, broken and caſt iron, pays on importation, the ton, 11 s. 11$\frac{62\frac{3}{4}}{100}$d. and draws back on exportation, 10 s. 9$\frac{37\frac{1}{2}}{100}$d. Backs for chimnies, ſmall, the piece, pay on importation, 2s. 4$\frac{52\frac{1}{2}}{100}$d. and draw back on exportation, 2 s. 2$\frac{62\frac{1}{2}}{100}$d. Backs for chimnies, large, the piece, pay on importation, 4 s. 9$\frac{50}{100}$d. and draw back on exportation, 4s. 5$\frac{25}{100}$d. Bands for kettles, the hundred wt. pay on importation, 12 s. 4$\frac{65}{100}$d. and draw back on exportation, 11 s. 5$\frac{25}{100}$d. Fire irons, the groce, pay on importation, 1 s. 11$\frac{10}{100}$d. and draw back on exportation, 1 s. 8$\frac{25}{100}$d. More for every hundred weight on importation, 4 s. 8$\frac{25}{100}$d. and draw back on exportation, 4 s. 8$\frac{25}{100}$d. Hoops the hundred wt. pay on importation, 9 s. 9$\frac{85}{100}$d. and draw back on exportation, 9 s. 2$\frac{25}{100}$d. Stoves, the piece, pay on importation, 19 s. 3 d. and draw back on exportation, 16 s. 10$\frac{50}{100}$d. More for every hundred weight on importation, 4 s. $8\frac{25}{100}$d. and draw back the ſame.

Iron kettles, the piece, pay 1 s. $2\frac{6\frac{1}{4}}{100}$d. and draw back; on exportation, the ſame; and beſides for every hundred weight on importation, 7 s. $8\frac{40}{100}$d. and draw back on exportation, 6 s. 9 d.

Pig or bar-iron, from the britiſh plantations in America, is imported free; but all ſuch iron muſt be ſtamped with a mark, denoting the colony, or place where it was made, and a certificate produced of the oath of the exporter, ſigned by two of the principal officers of ſuch colony; and the maſter, or commanding officer of the ſhip, or veſſel, importing ſuch iron, muſt make oath, that the iron ſo imported, is the ſame as that mentioned in the certificate.

Mill for IRON WORK. See SMITHERY.

IRON-SICK, in the ſea-language, is ſaid of a ſhip or boat, when her bolts or nails are ſo eaten with ruſt, and ſo worn away, that they occaſion hollows in the planks, whereby the veſſel is rendered leaky.

IRON-WORT, *ſideritis*, in botany. See the article SIDERITIS.

IRONY, in rhetoric, is when a perſon ſpeaks contrary to his thoughts, in order to add force to his diſcourſe; whence, Quintilian calls it diverſiloquium.

Thus, when a notorious villain is ſcornfully complemented with the titles of a very honeſt and excellent perſon; the character of the perſon commended, the air of contempt that appears in the ſpeaker, and the exorbitancy of the commendations, ſufficiently diſcover the diſſimulation or irony.

Ironical exhortation is a very agreeable kind of trope; which, after having ſet the inconveniences of a thing in the cleareſt light, concludes with a feigned encouragement to purſue it. Such is that of Horace, when, having beautifully deſcribed the noiſe and tumults of Rome, he adds ironically,

Go now, and ſtudy tuneful verſe at Rome!

IROQUOIS, the name of five nations in North America, in alliance with the britiſh colonies. They are bounded by Canada on the north, by the britiſh plantations of New-York and Penſylvania on the eaſt and ſouth, and by the lake Ontario on the weſt.

IRRADIATION, the act of emitting ſubtile effluvia, like the rays of the ſun, every way. See EFFLUVIUM.

IRRATIONAL, an appellation given to ſurd numbers and quantities. See the articles NUMBER, QUANTITY, and SURD.

IRREDUCIBLE *Caſe*, in algebra, is uſed for that caſe of cubic equations where the root, according to Cardan's rule, appears under an impoſſible or imaginary form, and yet is real. Thus in the equation, $x^3 - 90x - 100 = 0$, the root, according to Cardan's rule, will be $x = \sqrt[3]{50 + \sqrt{-24500}} + \sqrt[3]{50 - \sqrt{-24500}}$, which is an impoſſible expreſſion, and yet one root is equal to 10; and the other two roots of the equation are alſo real. Algebraiſts, for two centuries, have in vain endeavoured to reſolve this caſe, and bring it under a real form; and the queſtion is not leſs famous among them, than the ſquaring of the circle is among geometers. See the article EQUATION.

It is to be obſerved, that as in ſome other caſes of cubic equations, the value of the root, though rational, is found under an irrational or ſurd-form; becauſe the root in this caſe is compounded of two equal ſurds with contrary ſigns, which deſtroy each other; as if $x = 5 + \sqrt{5} + 5 - \sqrt{5}$; then $x = 10$; in like manner, in the *irreducible* caſe, when the root is rational, there are two equal imaginary quantities, with contrary ſigns, joined to real quantities; ſo that the imaginary quantities deſtroy each other. Thus the expreſſion:

$\sqrt[3]{50 + \sqrt{-24500}} = 5 + \sqrt{-5}$; and $\sqrt[3]{50 - \sqrt{-24500}} = 5 - \sqrt{-5}$. But $5 + \sqrt{-5} + 5 - \sqrt{-5} = 10 = x$, the root of the propoſed equation.

Dr. Wallis ſeems to have intended to ſhew, that there is no caſe of cubic equations irreducible, or impracticable, as he calls it, notwithſtanding the common opinion to the contrary.

Thus in the equation $r^3 - 63r = 162$, where the value of the root, according to Cardan's rule, is, $r = \sqrt[3]{81 + \sqrt{-2700}} + \sqrt[3]{81 - \sqrt{-2700}}$, the doctor ſays, that the cubic root of $81 + \sqrt{-2700}$, may be extracted by another impoſſible binomial, *viz.* by $\frac{9}{2} + \frac{1}{2}\sqrt{-}$; and in the ſame manner, that the cubic root of $81 - \sqrt{-2700}$ may be extracted, and is equal to $\frac{9}{2} - \frac{1}{2}\sqrt{-3}$; from whence he infers, that $\frac{9}{2}+\frac{1}{2}\sqrt{-3}+\frac{9}{2}-\frac{1}{2}\sqrt{-3}=9$, is one of the roots of the equation propoſed. And this is true: but thoſe who will conſult his algebra, p. 190, 191, will find that the rule he gives is nothing but a trial, both in determining that part of the root which is without a radical ſign, and that part which is within: and if the original equation had been ſuch as to have its roots irrational, his trial would never have ſucceeded. Beſides, it is certain, that the extracting the cube root of $81+\sqrt{-2700}$, is of the ſame degree of difficulty, as the extracting the root of the original equation $r^3-63r=162$; and that both require the triſection of an angle for a perfect ſolution. See M. de Moivre in the appendix to Saunderſon's algebra, p. 744. ſeq.

For Cardan's rule, ſee *Solution of cubic* EQUATION.

IRREDUCTIBLE *Caſe*, in algebra. See the article IRREDUCIBLE.

IRREGULAR, ſomething that deviates from the common forms, or rules; thus we ſay an irregular fortification, an irregular building, an irregular figure, *&c.* See the article FORTIFICATION, *&c.*

IRREGULAR, in grammar, ſuch inflections of words as vary from the original rules; thus we ſay, irregular nouns, irregular verbs, *&c.*

The diſtinction of irregular nouns, according to Mr. Ruddiman, is into three kinds, *viz.* variable, defective, and abundant; and that of irregular verbs into anomalous, defective and abundant. See ABUNDANT, DEFECTIVE, *&c.*

IRREGULAR, among caſuiſts, is applied to a perſon who is unqualified for entering into orders; as being baſe-born, notoriouſly defamed, *&c.* and by that means rendered incapable of holding a benefice, or diſcharging any of the ſacred functions.

IRREGULAR BODIES, are ſolids not terminated by equal and ſimilar ſurfaces.

IRREGULAR COLUMN, in architecture, a column which does not only deviate from the proportions of any of the five orders, but whoſe ornaments, whether in the ſhaft or capital, are abſurd and ill choſen.

IRREPLEVIABLE, or IRREPLEVISABLE, in law, ſignifies any thing that neither may nor ought to be replevied. It is ſaid, that it is againſt the nature of a diſtreſs for rent, to be irrepleviable.

IRTIS, a great river, which runs from north to ſouth through Ruſſia, falls into the river Oby, and makes part of the boundary between Aſia and Europe.

IRWIN, a port-town of Scotland, in the bailiwic of Cunningham, ſituated at the mouth of the river Irwin, on the Frith of Clyde: weſt longitude 4° 40′, north latitude 55° 35′.

ISABELLA, a fortreſs of the Auſtrian Netherlands, ſituated on the weſt ſide of the river Scheld, oppoſite to Antwerp, in eaſt longitude 4° 10°, north latitude 51° 15′.

ISAIAH, or *Prophecy of* ISAIAH, a canonical book of the Old Teſtament. Iſaiah is the firſt of the four greater prophets, the other three being Jeremiah, Ezekiel, and Daniel. This prophet was of royal blood, his father Amos being brother to Azariah, king of Judah. The five firſt chapters of this prophecy relate to the reign of Uzziah; the viſion, in the ſixth chapter, happened in the time of Jotham: the next chapters to the fifteenth, include his prophecies under the reign of Ahaz; and thoſe that were made under the reigns of Hezekiah and Manaſſeh, are related in the next chapters to the end. The ſtile of this prophet is noble, ſublime and florid. Grotius calls him the Demoſthenes of the Hebrews. He had the advantage, above the other prophets, of improving his diction by converſing with men of the greateſt parts and elocution, and this added a ſublimity, force, and majeſty to what he ſaid. He impartially reproved the vices of the age in which he lived, and openly diſplayed the judgments of God that were hanging over the jewiſh nation; at the ſame time denouncing vengeance on the Aſſyrians, Egyptians, Ethiopians, Moabites, Edomites, Syrians, and Arabians, who were inſtrumental in inflicting thoſe judgments. He foretold the deliverance of the Jews from their captivity in Babylon, by the hands of Cyrus king of Perſia, an hundred years before it came to paſs; but the moſt remarkable of his predictions are thoſe concerning the Meſſiah, in which he not only foretold his coming in the fleſh, but all the great and memorable circumſtances of his life and death.

ISAMBLUCES, in natural hiſtory, the name of a genus of foſſils, of the claſs of the ſelenitæ; but of the columnar, not the rhomboidal, kind. See the article SELENITÆ.

This word expreſſes a body in form of an obtuſe or blunt column, the ſides of which are all equal to one another. This diſtinguiſhes it from the genus of the iſchnambluces, or thin columnar ſelenitæ, two of the ſides of which being broader than the others, make it of a flatted form. The ſelenitæ of this genus conſiſt of ſix ſides, and two obtuſe or abrupt ends; and all their ſides being very nearly of the ſame breadth, they much reſemble broken pieces of the columns of ſprig chryſtal. See CRYSTAL, and ISCHNAMBLUCES.

The bodies of this genus, as well as the reſt of the columnar ſelenitæ, are ſubject to a longitudinal crack, which ſometimes admitting a ſmall quantity of clay, ſhapes it into the figure of an ear of graſs. Of this genus there are only two known ſpecies; 1. A whittiſh one, very much reſembling a broken ſprig of cryſtal, found among the white tobacco-pipe clay, near Northampton. And, 2. A ſhort and pellucid one, with ſlender filaments: this is found in the ſtrata of yellow clay in Yorkſhire, and ſometimes lying on the ſurface of the earth.

ISATIS, WOAD, in botany, a genus of the tetradynamia-ſiliquoſa claſs of plants, the corolla whereof conſiſts of four cruciform, oblong, obtuſe, patent petals, turning gradually ſmaller towards the ungues: the fruit is an oblong, lanceolato-obtuſe, compreſſed, ſmall pod, containing two valves, and conſiſting only of one cell: the ſeed is ſingle, ovated, and contained in the center of the fruit.

This plant is much uſed by dyers, as alſo in medicine, as an aſtringent, a vulnerary, and for ſtopping the menſes.

ISCHÆMUM, SCHOENANTH, in botany, a genus of plants, thus characterized by Scheukzer: the male and female flowers are ſeparate, but ſtand near each other; the male is a ſmall bivalve glume, placed on the calyx of the female flower, which is a biflorous glume: the ſeed is ſingle, and involved in the calyxes and corollulæ.

The whole plant is of a flagrant aromatic ſmell, and is accounted cephalic, but little uſed at preſent.

ISCHIA, an iſland in the Neapolitan Sea, ſituated fifteen miles weſt of the city of Naples, in 14° 40′, eaſt longitude, and 41° north latitude.

ISCHIADIC, in anatomy, a name given to two crural veins, called the greater and leſſer iſchias. See VEIN.

In ſignifies alſo a diſeaſe or pain of the hip; being a ſpecies of arthritis, ſeated i the joint of the hip, and commonly calle ſciatica. See the article SCIATICA.

ISCHIAS, one of the iſchiatic veins. Se VEIN, and the preceding article.

ISCHIUM, in anatomy, the name of bone deſcribed under the article innominata oſſa. See INNOMINATA.

ISCHNAMBLUCES, in natural hiſtory the name of a genus of foſſils, of the cla of the ſelenitæ; but one of thoſe whic are of a columnar form, not of the common rhomboidal one. See the articl SELENITÆ.

This word expreſſes a body in form of thin or flatted column, with obtuſe ends The characters of this genus are, tha the bodies of it are of a flatted columna form, and octohedral in figure, conſiſtin of ſix long planes, and about two abrup or broken ends: the whole being of flatted figure. The top and bottom plane are much broader than the reſt; the fou other planes, called the ſides, are narrower than theſe, but are uſually of ver nearly the ſame breadth with one another, as are alſo theſe tops and bottoms ſo that the whole figure comes very nea an hexhedral priſm. The bodies of thi genus very frequently have a long crack reaching their whole length; and clay often getting into this, ſpreads itſelf int the form of an ear of ſome of the graſſes and has been miſtaken for a real ear of graſs Of this genus there are only four know ſpecies. 1. A flat, broad, and pelluci kind, found in Northamptonſhire, Leiceſterſhire, and Yorkſhire, at conſiderably great depths in blue clay. 2. A dull rough-ſurfaced and thicker kind, found in many parts of Kent, and in great plenty in the cliffs of Sheppey iſland. 3. A dull longitudinally ſtriated kind, found in the clay pits of Yorkſhire and elſewhere, and frequently marked in the middle with the figure of an ear of graſs. And 4. A thick, rough, and ſcaly kind, frequent on the ſhores of Sheppey iſland, and both in the clay pits and on the ſhores of Yorkſhire. This alſo has frequently the repreſentation of an ear of graſs.

ISCHURY, ισχȣρια, in medicine, a diſeaſe conſiſting in an entire ſuppreſſion of urine. As the cauſes of an iſchury are various, they ought, according to Heiſter, to be carefully diſtinguiſhed from each other. When it proceeds from an inflammation of the kidneys, the pain and heat are principally in that region attended with a fever; if from a ſtone in the kidneys, it is accompanied with vomiting; if from a ſtone in the bladder there is a violent pain in the bladder, which is extended to the very extremity of the urethra; a mucus, or pus, is excreted with pale urine; and upon proper examinations the ſtone may be felt: but the moſt certain ſign, is ſearching the bladder with a catheter. When this diſorder ariſes from a ſtone in the urethra, it may be eaſily felt. If from an inflammation of the neck of the bladder, there is a tumour and pain in the perinæum, as often as the place is touched; but it may be beſt perceived by thruſting the finger into the anus, and turning it up towards the bladder, for a tumour will be perceived by the phyſician, and by the patient a burning and preſſing pain; and when a catheter is introduced into the urethra, an impediment will be felt near the neck of the bladder, which will hinder it from proceeding farther. See the article CATHETER.

When the urinous paſſages are obſtructed by ſolid bodies, that is, the pelvis of the kidneys, the ureters or neck of the bladder, or the urethra, from a ſtone contained therein; if it be ſmall, thoſe diuretics will be proper which are mentioned in a fit of the gravel or ſtone, to which may be added a decoction of eryngo-root and epſom-ſalt, or ſelters-waters, taken often therewith. But if the ſtone is large and cannot be excreted by this means, ſtrong diuretics are highly hurtful; and it muſt be cured by ſection. See the article LITHOTOMY.

If the urine is ſuppreſſed from an inflammation of the kidneys or bladder, recourſe muſt be had to the treatment and medicines preſcribed for the diſorders under the article INFLAMMATION.

When the ſpungy ſubſtance of the urethra is ſwelled with blood, and as it were inflated, a copious bleeding is the principal remedy. See GONORRHOEA.

When a ſpaſm affects the neck of the bladder, it muſt be treated with antiſpaſmodic powders, diuretic waters, and infuſions with emulſions and lenient oils now and then, ſuch as ſalad oil, oil of ſweet almonds, poppy or linſeed; externally, cataplaſms, ointments, clyſters, and baths of the emollient and demulcent kind, with gentle opiates. See SPASM.

If the diſeaſe proceeds from the palſy, as ſometimes happens in old perſons, wherein there is no pain, the belly and perinæum muſt be treated with frictions and fomentations of ſtrengthening, nervine and ſpirituous remedies, with cataplaſms of onions, and other ſtimulators applied to the bladder, with clyſters of the ſame ſort of herbs. When the urine is very urgent, it muſt be evacuated by a catheter, which muſt be repeated as often as occaſion requires. See PALSY.

If the diſorder proceeds from blood remaining in the bladder, or its neck, the concretion is to be reſolved and expelled with warm infuſions of digeſtive herbs drank like tea; ſuch as ground-ivy, arnica, chervil, with tincture of tartar, liquor of the terra foliata of tartar, with digeſtive powders of crabs-eyes, ſaturated with the juice of oranges or lemons, ſperma ceti, *&c.* but if all theſe fail, the catheter is to be introduced into the neck of the bladder, to break the concretion, and evacuate the urine. See the article RESOLVENTS, *&c.*

When there is an ulcer in the bladder, infuſions of vulnerary abſorbent roots and herbs muſt be given, with mucilages and ſoft balſamics, eſpecially balſam of Mecca, with a moderate uſe of quick-ſilver, eſpecially if the caſe is venereal. See the article ULCER.

If there is a difficulty of urine in pregnant women, towards the laſt months the beſt remedy is to eaſe the preſſure on the part; but if that will not do, to uſe a catheter.

Laſtly, if it proceeds from a ſwelling of the proſtrate glands, or it is become ſcirrhous, it muſt be treated as ſuch; but if theſe remedies fail, the bladder muſt be pierced with a trocar; and when the perforation is made, the water muſt be evacuated as in the dropſy. This inſtrument muſt be left in the wound, and faſtened in ſuch a manner, that it does not fall out, ſo that the urine may be made as often as there is occaſion. It is a troubleſome operation, but the only one left.

ISELASTICS, a kind of games, or combats, celebrated in Greece and Aſia, in the time of the roman emperors.

The victor at theſe games had very conſiderable privileges conferred on him, after the example of Auguſtus and the Athenians, who did the like to conquerors at the olympic, pythian, and iſthmian games. They were crowned on the ſpot immediately after their victory, had penſions allowed them, were furniſhed with proviſions at the public coſt, and were carried in triumph to their country.

ISENACH, a town of Germany in the circle of Upper Saxony, ſituated in eaſt long. 10° 12′, north lat. 51°.

ISENARTS, a town of Germany, in the circle of Auſtria, and dukedom of Stiria, ſituated thirty-five miles north weſt of Gratz.

ISERNIA, a town of Naples, in the province of Moliſe, ſituated in eaſt long. 15° 15′, north lat. 41° 36′.

ISIA, feaſts and ſacrifices antiently ſolemnized in honour of the goddeſs Iſis.

The Iſia were full of abominable impurities, and for that reaſon thoſe who were initiated were obliged to take an oath of ſecrecy: they held for nine days ſucceſſively, but were ſo abominable, that the ſenate aboliſhed them at Rome, under the conſulſhip of Piſo and Garbinius.

ISINGLASS, *ichthyocolla*, in the materia medica, &c. See ICHTHYOCOLLA.

ISINGLASS, in natural hiſtory, a name given to the white ſhining ſpecularis, with large and broad leaves; otherwiſe called muſcovy-glaſs. See the article SPECULARIS.

ISINGLASS FISH, the ſame with the huſo. See the article HUSO.

ISIS, in botany, the name by which Linnæus calls the coral-plant. See CORAL.

ISLAND, a tract of dry land, encompaſſed with water, in which ſenſe it ſtands contradiſtinguiſhed from continent, or terra firma. See the article CONTINENT.

Several naturaliſts are of opinion, that the iſlands were formed at the deluge; others think, that there have been new iſlands formed by the caſting up of vaſt heaps of clay, mud, ſand, &c. others think they have been ſeparated from the continent by violent ſtorms, inundations, and earthquakes. Theſe laſt have obſerved, that the Eaſt-Indies, which abound in iſlands more than any other part of the world, are likewiſe more annoyed with earthquakes, tempeſts, lightnings, vulcanos &c. than any other part, Others again conclude, that iſlands are as antient as the world, and that there were ſome at the beginning, and among other arguments, ſupport their opinion from Gen. x. 5. and other paſſages of ſcripture.

Varenius thinks, that there have been iſlands produced each of theſe ways. St. Helena, Aſcenſion, and other ſteep rocky iſlands, he ſuppoſes to have become ſo by the ſea's over-flowing their neighbouring champaigns: but by the heaping up huge quantities of ſand, and other terreſtrial matter, he thinks the iſlands of Zealand, Japan, &c. were formed. Sumatra and Ceylon, and moſt of the Eaſt-Indian iſlands, he thinks, were rent off from the main land; and concludes, that the iſlands of the Archipelago were formed in the ſame way, imagining it probable, that Ducalion's flood might contribute towards it. The antients had a notion that Delos, and ſome other few iſlands, roſe from the bottom of the ſea, which, how fabulous ſoever it may appear, agrees with later obſervations. Seneca takes notice, that the iſland Theraſia roſe thus out of the Ægean ſea in his time, of which the mariners were eye-witneſſes. They had alſo an opinion that there are ſome iſlands which ſwim in the ſea. Thales, indeed, thought that the whole earth which we inhabit floated in the ſea: but floating iſlands are not only probable, but well atteſted.

ISLAND or **ICELAND**, in geography, an iſland of Denmark, ſituated between 10 and 26 degrees weſt long. and between 64 and 67 north lat. being about 300 miles in length from eaſt to weſt; and 150 in breadth from north to ſouth.

ISLAND-*Cryſtal*, a body famous among the writers of optics, for its property of a double refraction; but very improperly called by that name, as it has none of the diſtinguiſhing characters of cryſtal, and is plainly a body of another claſs. Dr. Hill has reduced it to its proper claſs, and determined it to be of a genus of ſpars, which he has called, from their figure, parallelopipedia, and of which he has deſcribed ſeveral ſpecies, all of which, as well as ſome other bodies of a different genus, have the ſame properties. Bartholine, Huygens, and Sir Iſaac Newton, have deſcribed the body at large, but have accounted it either a cryſtal or a talc; errors which could not have happened, had the criterions of foſſils been at that time fixed; ſince Sir Iſaac Newton has recorded its property of making an ebullition with aqua fortis, which alone muſt prove that it is neither talc nor cryſtal, both thoſe bodies being wholly unaffected by that menſtruum. See the articles PARALLELOPIPEDIA, CRYSTAL and TALC.

It is always found in form of an oblique parallelopiped, with ſix ſides, and is found of various ſizes, from a quarter of an inch to three inches or more in diameter.

meter. It is pellucid, and not much leſs bright than the pureſt cryſtal, and its planes are all tolerably ſmooth, though, when nicely viewed, they are found to be waved with crooked lines made by the edges of imperfect plates. What appears very ſingular in the ſtructure of this body, is, that all the ſurfaces are placed in the ſame manner, and conſequently it will ſplit off into thin plates, either horizontally or perpendicularly; but this is found on a microſcopic examination, to be owing to the regularity of figure, ſmoothneſs of ſurface, and nice joining of the ſeveral ſmall parallelopiped concretions, of which the whole is compoſed; and to the ſame cauſe is probably owing its remarkable property in refraction. See REFRACTION.

It is very ſoft, and eaſily ſcratched with the point of a pin; it will not give fire on being ſtruck againſt ſteel, and ferments and is perfectly diſſolved in aqua fortis. It is found in Iſland, from whence it has its name; and in France, Germany, and many other places. In England fragments of other ſpars are very often miſtaken for it, many of them having in ſome degree the ſame property. See ANOMORHOMBOIDA.

ISLE, in general, denotes the ſame with iſland, only frequently uſed in a diminutive ſenſe.

ISLE DE DIEU, an iſland in the Bay of Biſcay, on the coaſt of France, ſituated fourteen miles weſt of the coaſt of Poitou.

ISLE *of France*, a province of that kingdom, in which the capital city of Paris is ſituated, being bounded by Picardy on the north, by Champain on the eaſt, by Orleans on the ſouth, and by Normandy on the weſt.

ISLES, in architecture, denote the ſides or wings of a building. See BUILDING.

ISNARDIA, in botany, a genus of the tetrandria-monogynia claſs of plants; having no corolla: the fruit is formed of the ſquare baſe of the cup: it has four cells, and in them a few ſeeds of an oblong figure.

ISNY, a free imperial city of Germany, in the circle of Swabia, ſituated in eaſt long. 10° north lat. 47° 36′.

ISOCHRONAL, **ISOCHRONE**, or **ISOCHRONOUS**, is applied to ſuch vibrations of a pendulum, as are performed in the ſame ſpace of time, as all the vibrations or ſwings of the ſame pendulum are, whether the arches it deſcribes be longer or ſhorter: for when it deſcribes a ſhorter arch, it moves ſo much the ſlower, and when a long one proportionably faſter.

ISOCHRONAL LINE, that in which a heavy body is ſuppoſed to deſcend without any acceleration. See ACCELERATION.

Mr. Leibnitz, in the Acta Erud. Lipſ. for Feb. 1689, ſhews, that an heavy body with a degree of velocity acquired by the deſcent from any height may deſcend from the ſame point by an infinite number of iſochronal curves, all which are of the ſame ſpecies, differing from one another only in the magnitude of their parameters; ſuch are all the quadrato-cubical paroboloids, and conſequently ſimilar to one another. He ſhews alſo there, how to find a line in which a heavy body deſcending ſhall recede uniformly from a given point, or approach uniformly to it.

ISOETES, in botany, a genus of the cryptogamia-filices claſs of plants; the calyx of which is a cordated, acute, ſeſſile ſquama: there is no corolla in either the male or female flowers; the fruit it an oval bilocular capſule; the ſeeds are numerous and globoſe.

ISOLA, a port town and biſhop's ſee of the hither Calabria, fifteen miles ſouth of St. Severino.

ISOMERIA, a term ſometimes uſed for the reduction of equations. See the article EQUATION.

ISOPERIMETRICAL FIGURES, in geometry, are ſuch as have equal perimeters, or circumferences. See the article CIRCUMFERENCE.

1. Of iſoperimetrical figures, that is the greateſt that contains the greateſt number of ſides, or the moſt angles, and conſequently a circle is the greateſt of all figures that have the ſame ambit as it has. See the article CIRCLE.

2. Of two iſoperimetrical triangles, having the ſame baſe, whereof two ſides of one are equal, and of the other unequal, that is the greater whoſe two ſides are equal. See the article TRIANGLE.

3. Of iſoperimetrical figures, whoſe ſides are equal in number, that is the greateſt which is equilateral and equiangular. From hence follows that common problem of making the hedging or walling that will wall in one acre, or even any determinate number of acres, a, fence or wall in any greater number of acres whatever b. In order to the ſolution of this problem, let the greater number b be ſuppoſed a ſquare. Let x be one ſide

of an oblong, whoſe area is a; then will $\frac{a}{x}$ be the other ſide; and $2\frac{a}{x} + 2x$ will be the ambit of the oblong, which muſt be equal to four times the ſquare root of b; that is, $2\frac{a}{x} + 2x = 4\sqrt{b}$. Whence the value of x may be eaſily had, and you may make infinite numbers of ſquares and oblongs that have the ſame ambit, and yet ſhall have different given areas. See the operation;

Let $\sqrt{b} = d$

Then $\frac{2a + 4xx}{x} = 4d$

$$a + 2xx = 2dx$$
$$2xx - 2dx = -a$$
$$xx - dx = -\frac{a}{2}$$
$$xx - dx + \tfrac{1}{4}dd = -\frac{a}{2} + \tfrac{1}{4}dd$$
$$x = \sqrt{-\frac{a}{2} + \tfrac{1}{4}dd} + \tfrac{1}{2}d$$

Thus if one ſide of the ſquare be 10; and one ſide of an oblong be 19, and the other 1: then will the ambits of that ſquare and oblong be equal, *viz.* each 40, and yet the area of the ſquare will be 100, and of the oblong but 19.

ISOPYRUM, in botany, a genus of the polyandria-digynia claſs of plants, the corolla of which conſiſts of five equal, ovated and patent petals: the fruit is compoſed of two crooked, lunated pods, with only one cell in each, containing numerous ſeeds.

ISOSCELES-TRIANGLE, in geometry, one that has two equal ſides, as A B C (pl. CXLVIII. fig. 2.) where the ſide A B is equal to A C.

In every iſoſceles-triangle, the angles A B C, A C B, ſubtended by the equal ſides, are equal; and a line A D biſſecting the baſe B C in D, is perpendicular to it, as is eaſily demonſtrated. See the article TRIANGLE.

ISPAHAN, or SPAHAWN, the capital city of Eyrac Agem, and of all Perſia: it is of an oval form, and twelve miles in circumference: eaſt long. 50°, north lat. 32° 30′.

ISPIDA, the KING-FISHER, in ornithology, a genus of the picæ-order of birds, with a beak of a trigonal figure, ſomewhat arcuated, compreſſed, and its two chaps equal: there are four toes on each foot, with only one of them placed behind.

This is a very numerous genus, the ſpecies of which are chiefly diſtinguiſhed by their ſize and different colours.

ISSUE, in law, has ſeveral ſignifications, it being ſometimes taken for the children begotten between a man and his wife; ſometimes, for profits ariſing from amercements and fines; and ſometimes, for the profits iſſuing out of lands or tenements: but this word generally ſignifies the concluſion, or point of matter, that iſſues from the allegations and pleas of the plaintiff and defendant in a cauſe tried by a jury of twelve men.

There are two kinds of iſſues in relation to cauſes, that upon a matter of fact, and that upon a matter of law: that of fact is where the plaintiff and defendant have fixed upon a point to be tried by a jury: and that in law is, where there is a demurrer to a declaration, &c. and a joinder in demurrer, which is determinable only by the judges. Iſſues of fact are either general or ſpecial: they are general, when it is left to the jury to find whether the defendant has done any ſuch thing as the plaintiff has alledged againſt him; and ſpecial, where ſome ſpecial matter, or material point alledged by the defendant in his defence, is to be tried. General iſſue alſo ſignifies a plea in which the defendant is allowed to give the ſpecial matter in evidence, by way of excuſe or juſtification; this is granted by ſeveral ſtatutes, in order to prevent a prolixity in pleading, by allowing the defendant to give any thing in evidence, to prove that the plaintiff had no cauſe for his action.

In real actions, the iſſues are triable by a jury of the county in which the cauſe of action ariſes. Iſſues are to be certain and ſingle, and joined upon the moſt material point in queſtion, ſo that the whole matter in diſpute between the parties may be tried. On a joint action of treſpaſs by many perſons, only one iſſue muſt be joined; and where ſeveral offences are charged againſt a defendant, he ought to take all but one by proteſtation, and then offer an iſſue on that one, and no more; though in an action for damages, every part, according to the loſs the plaintiff has ſuſtained, is to be put in iſſue. Where a good iſſue is joined between the parties, it cannot afterwards be waved, without the conſent of both parties: but where the defendant pleads the general iſſue, and does not enter the ſame, he may within four days of term wave ſuch iſſue, and plead ſpecially: ſo if a defendant pleads in abatement, he may any time after wave his ſpecial plea, and plead the general iſſue, except a rule be made for him to plead as he will ſtand by it: but in caſe the plaintiff omits entering the iſſue the term it is joined, the defendant in the firſt five days of the next term, may alter his plea, and plead de novo: and when the plaintiff will not try the iſſue, after the ſame is joined, within the time required by the courſe of law, the defendant may give him a rule to enter it, and if he does not then try it he ſhall be nonſuited.

Issues *on ſheriffs*, are ſuch amercements and fines to the crown, as are levied out of the iſſues and profits of the lands of ſheriffs, for their faults and neglects: but theſe iſſues, on ſhewing a good and ſufficient cauſe, may be taken off before they are eſtreated into the exchequer.

Iſſues are alſo leviable upon jurors, for non-appearance; though upon a reaſonable excuſe, proved by two witneſſes, the juſtices may diſcharge the ſame.

Issues, in ſurgery, are little ulcers made deſignedly by the ſurgeon in various parts of the body, and kept open by the patient, for the preſervation or recovery of his health.

The parts in which iſſues are generally made, are either the upper part of the head; the neck; the arms, betwixt the biceps and deltoide muſcle, and near the inſertion of the laſt; in the thigh, eſpecially within ſide, immediately above the knee, in a cavity eaſily felt by the fingers; and, laſtly, in the legs, on their interior ſide, in a cavity immediately below the knee.

There are ſeveral methods of making iſſues, but the moſt ready one is by inciſion, which is performed thus: firſt mark the proper place with ink; then elevating the integuments between the thumb and fore-finger of the ſurgeon and an aſſiſtant on each ſide, you next proceed to make an inciſion thro' them, either with the ſcalpel or lancet, big enough to admit a pea, which being inſerted and covered with a plaſter and compreſs, nothing more than your roller is wanting to compleat the operation. Thus by cleaning and dreſſing the wound every morning and evening with a freſh pea, it by degrees, in a day or two, degenerates into a little ulcer, diſcharging daily a quantity of purulent matter, which ſhould be carefully cleanſed or wiped off at every dreſſing.

There is a ſecond method of making iſſues by wounding the ſkin with an actual cautery, or red hot iron, which is uſually included in a ſort of capſula, or caſe of iron (plate CXLIX. fig. 2.) to conceal it from terrifying the patient. When the caſe B B is fixed upon the proper part for the iſſue, the red-hot iron C, is then preſſed down upon the integuments, and the eſchar, or burn, is next to be dreſſed with freſh butter or baſilicon, till by repeating the dreſſing every day, it ſeparates, and then the ulcer formed, is to be filled with a pea, and dreſſed as before.

The third method of making iſſues is by the application of potential cauteries, or corroding medicines; in order to which a piece of plaſter is firſt perforated, and then applied, ſo as its aperture may cover the place marked with ink for the iſſue: a piece of the cauſtic is then put into the aperture of the plaſter, and retained cloſe down upon the ſkin, with ſome ſcraped lint, a ſmall compreſs, and a large plaſter; and laſtly, with a larger compreſs and bandage. The patient is then to be ordered to reſt for about ſix or eight hours, more or leſs, according to the ſtrength of the cauſtic, which time being elapſed, and the dreſſings removed, the eſchar is to be treated as before directed in an actual cautery.

In whichever of theſe methods the iſſue is made, it muſt be dreſſed at leaſt twice every day, eſpecially if it runs well, and in the ſummer-ſeaſon: and at each dreſſing you muſt put in a freſh pea, and cover it with a clean plaſter, or a piece of waxed paper or ſilk, or an ivy-leaf retained with compreſs and bandage. But the deligation for iſſues is much more commodiouſly performed with a leathern ſwath, faſtened by claſps, than by a circular linen-roller. In this manner iſſues are to be kept open, till the patient is recovered of the diſorder for which they were made.

Iſſues are chiefly made for various diſorders in the head, eyes, ears, teeth, the ſciatica, and other painful diſorders, which are this way frequently relieved or cured. But in ſtubborn diſorders it is frequently neceſſary to make two or more iſſues to produce any conſiderable effect, as one in each arm, or in one arm and leg of the ſame ſide.

In order to cloſe an iſſue, little more is required than to diſcharge the pea, and to refrain from putting in any more, by which means alone it will cloſe up in a ſhort time: but if any proud fleſh ſhould ariſe, it may be amputated, or elſe removed with burnt alum. Laſtly, it is obſervable, that when the iſſues of people far advanced in years ceaſe to make their wonted diſcharge, and turn of a livid and blackiſh hue, it is a ſign that they are invaded by ſome deſperate diſorder, and that life itſelf is very near its period.

ISTHMIA, or **ISTHMIAN, GAMES**, ισθμια, one of the four ſolemn games which were celebrated every fifth year in Greece; ſo called from the corinthian iſthmus, where they were kept.

Theſe games, according to ſome, were inſtituted in honour of Palæmon, or Melicertes the ſon of Athamas king of Thebes, and Ino. Others report, that they were inſtituted by Theſeus, in honour of Neptune. Others again are of opinion, that there were two diſtinct ſolemnities obſerved in the Iſthmus, one to Melicertes, and another to Neptune. Theſe games were held ſo ſacred and inviolable, that when they had been intermitted for ſome time, through the oppreſſion and tyranny of Cypſelus king of Corinth, after the tyrant's death the Corinthians, to renew the memory of them, employed their utmoſt power and induſtry. The victors were rewarded with garlands of pine leaves; afterwards, parſley was given them: but at length, the pine was reſumed, and to this was added the reward of 100 ſilver drachmæ. Theſe games were ſo celebrated, and the concourſe at them ſo great, that only the principals of the moſt remarkable cities, could have place in them. The Athenians had only as much room allowed them as the ſail of a ſhip, which they ſent yearly to Delos, could cover.

ISTHMUS, in geography, a narrow neck of land, that joins two continents, or joins a peninſula to the terra firma, and ſeparates two ſeas. The moſt celebrated iſthmuſes are thoſe of Panama, or Darien, which joins north and ſouth America; and that of Suez, which connects Aſia and Africa; that of Corinth, of Crim Tartary, *&c.*

ISTRIA, a peninſula in the north part of the gulph of Venice, bounded by Carniola, on the north; and on the ſouth, eaſt, and weſt, by the ſea.

ITALIAN, the language ſpoken in Italy. See the article LANGUAGE.

This tongue is derived principally from the latin; and of all the languages formed from the latin, there is none which carries with it more viſible marks of its original than the italian. It is accounted one of the moſt perfect among the modern tongues, containing words and phraſes to repreſent all ideas, to expreſs all ſentiments, to deliver ones ſelf on all ſubjects, to name all the inſtruments and parts of arts, *&c.* It is however, complained, that it has too many diminutives and ſuperlatives, or rather augmentatives, but without any great reaſon: for if theſe words convey nothing farther to the mind than the juſt ideas of things, they are no more faulty than our pleonaſms and hyperboles. The language correſponds to the genius of the people; they are ſlow and thoughtful, and accordingly their language runs heavily, though ſmoothly, and many of their words are lengthened out to a great degree. They have a great taſte for muſic, and to gratify their paſſion this way, have altered abundance of their primitive words, leaving out conſonants, taking in vowels, ſoftening and lengthening out their terminations for the ſake of the cadence. Hence the language is extremely muſical, and ſucceeds better than any other in operas, and ſome parts of poetry: but it fails in ſtrength and nerves: hence alſo, a great part of its words borrowed from the latin, became ſo far diſguiſed, that they are not eaſily known again.

ITALIAN COINS. See COIN.

ITALIAN MEASURES. See MEASURE.

ITALIC CHARACTERS, in printing. See the article LETTER.

ITALIC, or **ITALIAN HOURS**, the twenty-four hours of the natural day, accounted from the ſun-ſetting of one day, to the ſame again the next day. See HOUR.

ITALIC SECT, the name of a ſect of antient philoſophers, founded by Pythagoras; ſo called, becauſe that philoſopher taught in Italy, ſpreading his doctrine among the people of Tarentum, Metapontus, Heraclea, *&c.* This ſect divided itſelf into four others, *viz.* the Heraclitic, Eleatic, *&c.*

ITALY, a country ſituated between ſeven and nineteen degrees eaſt long. and between thirty-eight and forty-ſeven degrees north latitude, bounded by Switzerland,

and the Alps, which ſeparate it from Germany, on the north; by the gulph of Venice, on the eaſt; by the Mediterranean Sea, on the ſouth; and by the ſame ſea and the Alps, which ſeparate it from France, on the weſt; and if we include Savoy, which lies indeed on the weſt ſide of the Alps, between Italy and France, we muſt extend it a degree farther weſt: this is uſually deſcribed however with Italy, as it is contiguous to Piedmont, and has the ſame ſovereign, being a province of the king of Sardinia's dominions. Italy is ſaid to reſemble a boot, and is in length from north-weſt to ſouth-eaſt 600 miles; the breadth is very unequal; in the north, which may be called the top of the boot, it is 400 miles broad from eaſt to weſt, in the calf of the leg, or middle, it is about 120 miles broad; and towards the ſouth, about the inſtep, eighty miles broad; and comprehends the following countries or ſubdiviſions. 1. In the north are the duchies of Savoy, Piedmont, and Montſerrat; the territories of Genoa; the duchies of Milan, Mantua, Parma, Modena, and the territories of Venice. 2. In the middle of Italy, are the duchy of Tuſcany, the pope's dominions, and the ſtate of Lucca. 3. And in the ſouth is the kingdom of Naples.

ITCH, a cutaneous diſeaſe, ariſing from a corruption of a ſerous lymphatic matter, ſometimes attended with mild, ſometimes with more obſtinate and dangerous ſymptoms.

The itch of the milder ſort appears either with moiſt or dry puſtules at firſt about the joints, and from thence ſpreads by degrees over all the body, the head only excepted. In the moiſt ſort, to which children and the ſanguineo-phlegmatic are moſt ſubject, the puſtules are more full of a purulent matter, attended with a ſlight inflammation, which is manifeſt from a redneſs that appears about them, till it ſuppurates. The dry ſort attacks chiefly thoſe that are lean, old, or are of a melancholico-choleric conſtitution. In theſe the puſtules are much leſs, and excite a moſt intolerable itching, eſpecially in the night-time. The moſt uſual places where the eruptions appear very numerous, and the itching is greateſt, are between the fingers, on the arms, hams, and thighs.

This diſeaſe is truly and properly a diſeaſe of the ſkin, becauſe it often is ſafely cured by topics alone, if timely applied. It is contagious, and may be caught by drawing on a glove or ſtocking, wiping on the linen, or lying in ſheets, after perſons infected with this malady. Some think it owing to an impurity in the ſerum, and ſome to animalcula; but however that be, it often affects ſuch as have been long kept in priſon, who lead unactive lives, and are uſed to live in a ſluttiſh, naſty manner; or who conſtantly eat fiſh or fleſh dried in the ſmoke or ſun, and uſe any other unwholeſome food or drinks; or who live in a cold, moiſt, and cloudy air, which, hindering a free perſpiration, cauſes a ſtagnation of humours in the ſuperficies of the body, which are for that reaſon liable to corrupt.

The milder ſort of itch is no way dangerous, and very eaſy to cure: but the moiſt kind is more eaſy than the dry. While it is recent and ſuperficial, it much ſooner yields to remedies than when it is deep, and has infected the maſs of blood. And the caſe is ſtill worſe, if there be a fault in the viſcera: it is more difficult in old perſons, than in young; in a leucophlegmatic, or hydropical diſpoſition, as alſo in a very dry hectic one, it is hard to cure; and when it becomes univerſal, it may bring on the leproſy.

The patient ſhould avoid ſhell-fiſh, and all ſalted and high-ſeaſoned meats; as alſo wine, ſpirituous liquors, ſtrong-beer, and every thing elſe that may inflame the blood: for this reaſon a ſlender diet is beſt, unleſs perſpiration be obſtructed. If the body is plethoric, the cure is begun by bleeding, and afterwards by purging; but inſtead of purging, it is common to give flowers of ſulphur with good ſucceſs. Willis, and many others, have a great opinion of the efficacy of ſulphur uſed both internally and externally; to which Turner aſſents, except in hectic and conſumptive caſes; but Shaw thinks it not to be depended on, when outwardly uſed: yet it is very certain, that poor people find a great deal of benefit who drink it inwardly with milk, and uſe it outwardly with butter or hog's lard.

Juncker, from Stahl, calls the following things ſpecifics againſt the acrimony of the itch, taken internally, *viz.* ſulphur with nitre and arcanum duplicatum, balſam of ſulphur with oil of ſweet almonds, tincture of ſulphur, and crude antimony. Outwardly he adviſes mercurial ointments, and ſulphureous lixiviums; but in the dry itch, he thinks baths more proper made of the root of burdock, the ſharp-pointed dock, and mineral fountain-water. Turner prefers the ſal. tart. to moſt other remedies, it thoroughly purging and cleanſing the blood if taken inwardly; and made into a lixivium with ſpring-water, is an excellent waſh outwardly.

Hartman, in an obſtinate itch, propoſes a diaphoretic of the white flowers of antimony to be taken twenty days together. When the blood is thought to be foul, it will be proper to uſe diet-drinks of the roots of china, ſarſaparilla, oxylapathum, ſcorzonera, chichory, glycyrrhiza, polypodium, the barks of ſaſſafras, cinnamon, and the like.

The moſt ſtubborn itch will generally yield to the following ointment, if proper evacuations have been premiſed. Take of quickſilver, three drams; native cinnabar, one dram; venice turpentine, half a dram; hog's lard, half an ounce; oil of ſweet almonds, two drams. Mix and divide this into eight equal parts, one of which is to be rubbed into the legs and arms every other night, or at greater intervals, if there are any ſigns of ſalivation: great care muſt be taken that the patient gets no cold, while he uſes this medicine; if he feels any griping pains, or if his breath begins to ſtink, the uſe of it is immediately to be ſuſpended. It has been a very common practice to cure the itch by quickſilver-girdles, but Turner thinks them too hazardous to be brought into regular practice. See the article GIRDLE.

If this diſeaſe ſhould prove ſo ſtubborn as not to give way to the moſt powerful of the preceding methods, recourſe muſt be had to ſalivation as the dernier reſort. See the article SALIVATION.

But notwithſtanding theſe opinions, Dr. Mead affirms, that neither cathartics nor ſweetners of the blood are of any ſervice in this diſeaſe; that the whole management of it conſiſts in external applications for deſtroying the corroding worms, which he takes to be the true cauſe of the diſeaſe. For, he ſays, that there are certain inſects ſo very ſmall, as hardly to be ſeen without the aſſiſtance of a microſcope, which depoſite their eggs in the furrows of the cuticle, as in proper neſts, where by the warmth of the place, they are hatched in a ſhort time, and the young ones coming to full growth, penetrate into the cutis, and gnaw and tear the fibres, which cauſe an intolerable itching; that while they burrow under the cuticle, and lay their eggs in different places, they ſpread the diſeaſe. See the next article.

This was firſt diſcovered by Dr. Bonomo, and by him communicated to the celebrated Redi of Florence; and Dr. Mead having met with Bonomo's letter upon this ſubject in Italy, made an abſtract of it, and communicated it to the Royal Society. The doctor adviſes, that the patient ſhould firſt go into a warm bath, and then have the parts affected every day anointed with ointment of ſulphur, or the ointment with precipitate of mercury.

ITCH-ANIMAL, or **ITCH-ACARUS**, in the hiſtory of inſects, a very ſmall ſpecies of acarus, the body of which approaches to an oval and lobated figure; the head is ſmall and pointed; its colour is whitiſh, but it has two duſky, ſemicircular lines on the back; the legs are ſhort, and of a browniſh colour, and are harder than the reſt of the body, and as it were cruſtaceous. It is found in the puſtules of the itch, and is by many thought to cauſe that diſeaſe, though it is ſuppoſed if this were the caſe, it would be found more univerſally in thoſe puſtules. It is thought therefore more probable, that theſe puſtules only make a proper nidus for it. See the articles ACARUS and ITCH.

ITEA, in botany, a genus of the pentandria-monogynia claſs of plants, the corolla whereof is compoſed of five long, lanceolated, acute, patent petals; the fruit is an oval capſule, of many times the length of the cup, mucronated with the ſtyle, and formed of two valves, cohering at the points; the cell is ſingle, and the ſeeds numerous and ſmall.

ITINERANT JUDGES, a name formerly given to thoſe judges who were ſent into ſeveral counties to hear cauſes. See the article JUDGE.

JUBILEE, a time of public and ſolemn feſtivity among the antient Hebrews.

This was kept every fiftieth year: it began about the autumnal equinox, and was proclaimed by ſound of trumpet throughout all the country. At this time all ſlaves were releaſed, all debts annihilated, and all lands, houſes, wives and children, however alienated, were reſtored to their firſt owners. During this whole year all kind of agriculture was forbidden, and the poor had the benefit of the harveſt, vintage, and other productions of the earth, in the ſame manner as in the ſabbatic, or ſeventh year. As this was deſigned to put the Iſraelites in mind of their egyptian ſervitude, and to prevent their impoſing the like upon their brethren, it was not obſerved by the gentile proſelytes.

The Chriſtians, in imitation of the Jews, have likewiſe eſtabliſhed jubilees, which began in the time of pope Boniface VIII. in the year 1300, and are now practiſed every twenty-five years; but theſe relate only to the pretended forgiveneſs of ſins, and the indulgences granted by the church of Rome: together with the privilege of performing a thouſand frolics in maſquerade. The ceremony of the jubilee obſerved at Rome, begins in the following manner: the pope goes to St. Peter's church, to open the holy gate, which is walled up, and opened only on this occaſion; and, holding a golden hammer in his hand, he knocks at the gate three times, repeating theſe words, *Aperite mihi portas juſtitiæ*, &c. *Open to me the gates of righteouſneſs; I will go into them, and I will praiſe the Lord*, Pſ. cxviii. 19. upon which the maſons fall to work, and break down the wall that ſtops up the gate: which done, the pope kneels down before it, and the penitentiaries ſprinkle him with holy water. Then, taking up the croſs, he begins to ſing te deum, and enters the church, followed by the clergy. In the mean time, three cardinal-legates are ſent to open the three other holy gates which are in the churches of St. John of Lateran, St. Paul, and St. Mary the Greater. When the holy year is expired, the holy gates are ſhut in this manner: the pope, after he has bleſſed the ſtones and mortar, lays the firſt ſtone, and leaves there twelve boxes of gold and ſilver medals; after which the holy gates are walled up as before, and continue ſo till the next jubilee.

JUCATAN, or YUCATAN, a peninſula of Mexico, ſituated between 89° and 94° weſt long. and between 16° and 21° north lat.

Its chief town is Campeachy. See the article CAMPEACHY.

JUDAICUS LAPIS, in the materia medica, the petrified ſpine of an echinus. See the article JEW's STONE.

JUDAISM, the religious doctrines and rites of the Jews. See the article JEWS.

JUDDOCK, in ornithology, the engliſh name of a ſmall ſpecies of ſnipe, called alſo the ged or jack-ſnipe, and by authors gallinago minima.

JUDE, or *the general epiſtle of* JUDE, a canonical book of the New Teſtament, written againſt the heretics, who by their diſorderly lives and impious doctrines, corrupted the faith and good morals of the Chriſtians. St. Jude draws them in lively colours, as men given up to their paſſions, full of vanity, conducting themſelves by worldly wiſdom, and not by the ſpirit of God.

In the early ages of chriſtianity, ſeveral rejected this epiſtle becauſe the apocryphal books of Enoch and the aſcenſion of Moſes are quoted in it. Nevertheleſs, it is to be found in all the antient catalogues of the ſacred writings; and Clement of Alexandria, Tertullian and Origin, quote it as written by Jude, and reckon it among the books of ſacred ſcripture.

JUDEA, or PALESTINE. See PALESTINE.

JUDENBURG, a city of Stiria, in Germany: eaſt long. 15°, north lat. 47° 22′.

JUDGE, a chief magiſtrate of the law, appointed to hear criminal cauſes, to explain the laws, and to paſs ſentence according to the verdict brought in by the foreman of the jury. See JURY.

A judge, on his being created, takes an oath of office, that he will ſerve the king, and indifferently adminiſter juſtice to all men, without reſpect of perſons; that he will take no bribe; give no counſel, where he is a party; nor deny right to any, even though the king by his letters, or by expreſs words, command the contrary; and that he may have no temptation to break his oath, he enjoys his office and a ſettled ſalary for life, and it is not in the power of the crown to deprive him of either. He is to execute his office in perſon, and cannot act by a deputy, nor transfer his power to another: yet where there are ſeveral judges in a court of record, the act of any one of them is effectual, provided their commiſſion does not require more: ſo likewiſe what is carried by a majority preſent, is the act of the court: but where they are equally divided in opinion, the cauſe is to be removed into the exchequer-chamber, and for that purpoſe a rule is to be made, and the record certified, &c. Some things done by judges at their chambers, are accounted as done by the court: and that they may be prepared to hear what is to come before them, they are to have a paper of the cauſes to be heard, ſent to them by the attorneys the day before they are ſpoken to; that if upon reading the record of a cauſe any ſpecial matter that ariſes ſhould appear doubtful, they may ſatisfy themſelves by conſulting books.

To ſupport their dignity and authority, the judges of the courts of record are exempted from all proſecutions whatſoever, except in parliament, where alone they may be puniſhed for any thing they have done amiſs in their own courts as judges: but yet if a judge ſhould ſo far forget his dignity as to turn ſollicitor in a cauſe which he is to judge, and extrajudicially tamper with witneſſes, or attempt to work upon jurors, he may be dealt with in a manner ſuitable to the character to which he has ſo baſely degraded himſelf. As the judge is the ſubſtitute of the king, and is deſigned to diſtribute that juſtice which he cannot adminiſter in perſon, he cannot be challenged like a jury, nor have any action brought againſt him for what he acts as a judge: while he is on the bench his perſon is in a manner ſacred, ſo that to kill a judge of any of the ſuperior courts of Weſtminſter, or of aſſize, on the place of adminiſtring juſtice, is treaſon; and drawing a weapon upon him in any of the courts of law, is to be puniſhed with the loſs of the right hand, the forfeiture of lands and goods, and perpetual impriſonment. On the other hand, a judge cannot ſit as judge in his own cauſe: if he is guilty of taking a bribe, he is puniſhable by loſs of office, fines and impriſonment; and if a judge, who has no juriſdiction, paſſes judgment of death, and his ſentence is executed, both he, and the officer who executes it, is guilty of felony.

Itinerant JUDGES. See the article ITINERANT.

Book of JUDGES, a canonical book of the Old Teſtament, ſo called from its relating the ſtate of the Iſraelites under the adminiſtration of many illuſtrious perſons who were called judges, from their being both the civil and military governors of the people, and who were raiſed up by God upon ſpecial occaſions, after the death of Joſhua, till the time of their making a king. In the time of this peculiar polity, there were ſeveral remarkable occurrences, which are recorded in this book. It acquaints us with the groſs impiety of a new generation which ſprung up after the death of Joſhua, and gives us a ſhort view of the diſpenſations of heaven towards this people, ſometimes relieving and delivering them, and at others, ſeverely chaſtiſing them by the hands of their enemies.

The book of judges is uſually divided into two parts: the one containing the hiſtory of the judges from Othniel to Sampſon; which ends with the ſixteenth chapter: the other containing ſeveral memorable actions, which were performed in or about the time of the judges, from the ſeventeenth chapter to the end of the book. The author of this book is wholly unknown; ſome aſcribe it to Samuel, others to Hezekiah, and others to Ezra.

JUDGMENT, among logicians, a faculty or rather act of the human ſoul, whereby it compares its ideas, and perceives their agreement or diſagreement. See the article KNOWLEDGE.

Not ſatisfied with the bare view and contemplation of its ideas, the mind aſſembles them together, and compares them one with another. In this complicated view of things, it readily diſcerns that ſome agree, and others diſagree; and accordingly joins or ſeparates them. Thus upon comparing the idea of two added to two, with the idea of four, we at firſt glance perceive their agreement, and pronounce them equal. Again, that white is not black, and that four and two do not make eight, are truths the mind as readily perceives.

This is the firſt and ſimpleſt act of the mind, in determining the relations of things; when by a bare attention to its own ideas, comparing any two of them together, it can at once ſee how far they are connected or disjoined. The knowledge thence derived is called intuitive, as requiring no pains or examination; and the act of the mind aſſembling its ideas together, and joining or disjoining them according to the reſult of its perception, is what logicians call judgment. See the articles IDEA, PERCEPTION, KNOWLEDGE, *&c.*

In common diſcourſe, however, the term judgment is ſeldom confined to ſelf-evident truths; but rather ſignifies thoſe conjectures that we form, which do not admit of undoubted certainty, and where we are left to determine by comparing the various probabilities of things. Thus a man of ſagacity, who ſeldom miſtakes in the opinions he frames of characters and actions, is ſaid to judge well, or think judiciouſly. Hence it might not be improper to change the common names of the two firſt operations of the mind, calling the one ſimple apprehenſion,

ſion, and the other intuition. See the articles APPREHENSION and INTUITION.

JUDGMENT, in law, the ſentence of the judges upon a ſuit, &c.

Judgment may be given not only upon the trial of the iſſue, but on a default, confeſſion, demurrer, or an out-lawry, which is a judgment in itſelf. After iſſue joined in a cauſe, the plaintiff may, if he thinks proper, accept of a judgment from the defendant; but on ſuch a judgment, a writ of error may be had without putting in bail, which cannot be done on a judgment after verdict. All judgments given in courts of record muſt be entered; in order to which the plaintiff's attorney, four days after the record is brought into court, may, if the judgment is out, enter judgment by the uſual courſe of the court; but he cannot do this ſooner, becauſe the defendant muſt have time to bring in a writ of error, or to find out matter for an arreſt of judgment. The defendant may oblige the plaintiff to enter his judgment, in order that he may plead it to any other action; and judgment upon a demurrer to a declaration, &c. which does not paſs upon the merits of the cauſe, is no bar to it, though other judgments may be pleaded in bar to any action brought again for the ſame thing. Judgments are to continue till they are reverſed: but an action of debt will lie on a good judgment, as well after a writ of error is brought, as before it. If a plaintiff does not take out an execution within a year and a day after judgment is obtained, the judgment muſt be revived by a ſcire facias. See the article SCIRE FACIAS.

JUDGMENTS *for crimes*, in caſe of treaſon or felony, muſt be by an expreſs ſentence, an out-lawry or abjuration: and no judgment can be inflicted contrary to law, or that is not appointed by act of parliament. Theſe judgments are of very different kinds; as in high treaſon the offender is ſentenced to be drawn, hanged, his intrails taken out and burnt, his head cut off, and his body quartered, &c. In petit treaſon the judgment is, to be drawn to the place of execution, and there hanged. But a woman in all caſes of high and petit treaſon, is to be drawn and burnt. All perſons for felony, are to be hanged by the neck till dead. Judgment in miſpriſion of treaſon, is impriſonment for life: and for miſpriſion of felony, the offender is ſubject to a fine and impriſonment; and for crimes of an infamous nature, the judgments are diſcretionary in the breaſt of the court, and thoſe guilty are puniſhed by a fine, pillory, &c.

JUDGMENTS *for debts*, are acknowledged by a perſon's giving a general warrant of attorney to any attorney of the court in which it is to be acknowledged, to appear for him at the ſuit of the party to whom the ſame is to be done, and to file common bail, receive a declaration, and then to plead, *non ſum informatus*, I am not informed; or to let it paſs by *nihil dicit*, he ſays nothing; upon which judgment is entered for want of a plea. Judges that ſign judgment of lands, are to ſet down the day of the month and year in which they do it; and they ſhall be good againſt purchaſers only from ſuch ſigning. Where a perſon has acknowledged a judgment for the ſecurity of money, and afterwards on borrowing more money of another perſon mortgages his lands, &c. without giving any notice of the judgment to the mortgagee; in ſuch caſe, if the mortgager do not within ſix months pay off and diſcharge the judgment, he ſhall forfeit his equity of redemption, 4 and 5 Will. and Mary. Acknowledging a judgment in the name of another perſon without his privity or conſent, is made felony, by 21 Jac. I. c. 26.

JUDICIUM DEI, judgment of God, in law, a term applied to the trial by combat, by ordeal, &c.

JUDOIGNE, a town of the Auſtrian Netherlands, in the province of Brabant, ſituated on the river Gheet, thirteen miles ſouth-eaſt of Louvain, and ſixteen north of Namur.

IVES, or St. IVES, a borough and port-town of Cornwal, ſituated on the iriſh channel: it ſends two members to parliament: weſt long. 6°, north lat. 50° 18'.

JUGALE, in anatomy, the cheek-bone. See the article MALA.

JUGERUM, in roman antiquity, a ſquare of 120 roman feet; its proportion to the Engliſh acre being as 10000 to 16097. See the article MEASURE.

JUGLANS, the WALNUT-TREE, in botany, a genus of the monoecia-polyandria claſs of plants, the male corolla whereof being divided into ſix parts, is elliptic, equal, and plane; the female one is divided into four ſegments, acute, erect, and a little greater than the cup; the fruit is a large, dry, oval, unilocular berry, with a ſulcated kernel.

This tree grows to a very conſiderable height, and is very ramoſe, and diffuſe, from a third of its height upwards; the leaves are pinnated, and the pinnæ are obſcurely ſerrated. We have it every where in our gardens. The kernel of the walnut is ſimilar in quality to almonds; the ſhell is aſtringent, and as ſuch is made uſe of by the dyers; but neither are employed in medicine. There is an oil expreſſed from the walnut, which poſſeſſes the ſame quality with that expreſſed from linſeed and muſtard, all agreeing in one common emollient virtue. It ſoftens and relaxes the ſolids, and obtunds acrimonious humours; and thus becomes ſerviceable, internally, in pains, inflammations, heat of urine, hoarſeneſs, coughs, &c. in glyſters, for lubricating the inteſtines, and promoting the ejection of indurated fæces; and in external applications, for tenſions, and rigidity of particular parts. It is given inwardly, from half an ounce to three ounces, or more.

JUGULAR, in anatomy, an appellation given to two veins of the neck, which ariſe from the ſubclavians. 1. The external jugular, diſtributed over the external parts of the head; and which, in its ſeveral parts, receives different denominations from them, as the frontal, temporal, occipital, &c. vein. 2. The internal jugular, which gives ramifications to the larynx, the pharynx, the muſcles of the os hyoides, and to the tongue; thoſe which are under its vertex being called raninæ. But beſides theſe branches, its trunk terminates in a diverticulum, called the jugular ſack, and brings back the blood from the ſinuſes of the dura mater, and from the brain. See VEIN.

There are alſo certain glands in the anterior part of the neck, called jugular. See the article GLAND.

IVICA, or YVICA, the capital of an iſland of the ſame name, fifty miles eaſt of Valencia in Spain: eaſt longitude 1°, north latitude 39°.

JUICE, denotes the ſap of vegetables when expreſſed. See the article SAP.

Under this head, Quincy tells us, we have nothing either in officinal or extemporaneous preſcription, unleſs the acacia and liquorice-juice.

But beſides theſe, there are other inſpiſſated juices, frequently uſed in medicine, as ſcammony, aloes, gamboge, opium, catechu, elaterium, &c.

Juice of lemons, the pipe, pays on importation, 1 l. 10 s. $4\frac{80}{100}$d. and draws back on exportation, 1 l. 8 s. 6 d. Juice of limes, the gallon, pays, on importation, $2\frac{28}{100}$d. and on exportation draws back $2\frac{13\frac{3}{4}}{100}$d.

JUICE is alſo uſed to denote the liquors of animals, as the nervous juice, the pancreatic juice, &c.

JUJUBES, *jujubæ*, in the materia medica, the name of a fruit of the pulpy kind, produced on a tree called by authors ziziphus, which Linnæus makes a ſpecies of rhamnus. See RHAMNUS.

This fruit is of an oblong figure, and ſomewhat reſembles a large olive in its ſhape and ſize: its uſual length is about an inch, and its thickneſs ſomewhat more than half an inch. It is wrinkled on the ſurface deeply and irregularly, and when cut or broken, is found to conſiſt of a thick pellicle, of a duſky yellowiſh red colour, under which there lies a whitiſh and ſoft pulpy, fungous matter, encloſing a ſtone of an oblong figure. It has but little ſmell, but is of a ſweetiſh and reſinous taſte. It is to be choſen new, large, plump, and full of pulp, and of a ſweet and pleaſant taſte.

The jujubes have been made a general ingredient in pectoral decoctions; but they are now ſeldom uſed on theſe occaſions, and are ſcarce at all heard of in preſcription, or to be met with in our ſhops.

JULEP, in pharmacy, a medicine compoſed of ſome proper liquor, and a ſyrup or ſugar of extemporaneous preparation, without decoction, deſigned for the concoction or alteration of the humours, or reſtoring the ſtrength.

Diſpenſatory writers mention ſeveral kinds of juleps. 1. The camphorated julep, thus prepared: take of camphire, one dram; of double refined ſugar, half an ounce; of boiling water, a pint. Firſt grind the camphire with a little rectified ſpirit of wine, till it is ſoftened; then with the ſugar, till they are perfectly united; laſtly, add the water by degrees; and, when the mixture has ſtood in a covered veſſel, till it is cold, ſtrain it off. 2. Chalk-julep, thus made: take of the whiteſt chalk prepared, one ounce; of double refined ſugar, ſix drams; of gum arabic, two drams; of water, a quart. Mix all together. 3. The muſk-julep, thus prepared: take of damaſk-roſe-water, ſix ounces; of muſk, twelve grains; of double refined ſugar, one dram. Grind the muſk and ſugar together, and gradually add the roſe-water. Beſides theſe, there are ſeveral other preparations made up in the form of juleps, and denominated from their uſes, balſamic, cephalic, carminative, ſtrengthening, &c. juleps.

JULIAN, or St. JULIAN, a harbour on the coaſt of Patagonia, in South America, where ſhips bound to the South ſeas uſually touch: weſt long. 74°, north lat. 48° 15′.

JULIAN PERIOD, in chronology, a ſyſtem or period of 7980 years, found by multiplying the three cycles of the ſun, moon, and indiction into one another. See the article CYCLE.

This period was called the julian, not becauſe invented by Julius Cæſar; ſince the julian epocha was not received till the year 4669, but becauſe the ſyſtem conſiſts of julian years. This epocha is not hiſtorical, but artificial, being invented only for the uſe of true epochas: for Scaliger conſidering that the calculation was very intricate in uſing the years of the creation, the years before Chriſt, or any other epocha whatever, in regard that another perſon could not underſtand what year this or that writer meant; to remove ſuch doubts in the computation of time, he thought of this period; which commencing 710 years before the beginning of the world, the various opinions concerning other epochas may commodiouſly be referred to it. See EPOCHA.

The moſt remarkable uſes of the julian period are as follow. 1. That we can explain our mind to one another, for every year in this period has its peculiar cycles, which no other year in the whole period has; whereas, on the contrary, if we reckon by the years of the world, we muſt firſt enquire how many years any other reckons from the creation to the year of Chriſt, which multiple inquiſition is troubleſome and full of difficulties, according to the method of other periods. 2. That the three cycles of the ſun, moon, and indiction, are eaſily found in this period. 3. That if it be known how the chronological characters are to be found in this period, and how the years of any other epocha are to be connected with the years of it, the ſame characters alſo may, with little labour, be applied to the years of all other epochas. See the article CHARACTER.

JULIERS, the capital of the dutchy of the ſame name, ſituated on the river Roer, twenty miles weſt of Cologn, and as many eaſt of Maeſtricht: eaſt long. 6°, north lat. 50° 55′.

JULIS, or JULIA, in ichthyology, names given to the variegated ſmall labrus, with two large teeth in the upper jaw. See the article LABRUS.

JULPHA, or *Old* JULPHA, once the capital of Armenia, but now in ruins, the inhabitants being tranſplanted to a town within a mile of Iſpahan, called New Julpha, and there they carry on a foreign trade with all the countries in Aſia. The ſituation of Old Julpha was in eaſt long. 46°, north lat. 39°.

JULUS, in botany, the ſame with what is otherwiſe called catkins or amentaceous flowers. See AMENTACEOUS.

JULUS is alſo the name of an inſect very common among rubbiſh, and called in engliſh the gally-worm: it is furniſhed with a great number of feet, has the power of rolling itſelf up like a ball when touched, and is eſteemed a very valuable medicine in the jaundice and ſuppreſſion of urine.

JULY, in chronology, the ſeventh month of the year, ſo called in honour of Julius Cæſar; before whoſe time it was known by the name of quintilis, as being the fifth month of the old roman year. See the articles MONTH and YEAR.

JUMENTA, in zoology, the name by which Linnæus calls the fifth order of quadrupeds, the characteriſtic of which is, that the teeth of all the animals belonging to it are placed in a different manner from the other five orders. See the article QUADRUPEDS.

To this order belong the elephant, rhinoceros, hippopotamus, horſe, and hog. See ELEPHANT, RHINOCEROS, &c.

JUNCO, the *reed ſparrow*, in ornithology. See the article SPARROW.

JUNCUS, the RUSH, in botany, a genus of the hexandria-monogynia claſs of plants, which has no corolla; but the perianthium, when freſh and coloured, greatly imitates one: the fruit is a coloured capſule, of a triquetrous figure, and formed of three valves, containing a few roundiſh ſeeds.

Authors have divided the ſeveral ſpecies of juncus into what they call ruſhes, and ruſh-graſſes, from their having or wanting leaves; but the fructifications in both are the ſame.

JUNE, the ſixth month of the year, during which the ſun enters the ſign of Cancer,

Cancer. See MONTH and YEAR.

In this month is the ſummer ſolſtice. See the article SOLSTICE.

JUNGERMANNIA, a genus of the cryptogamia-algæ claſs of plants, conſiſting uſually of ſtalks furniſhed with leaves, diſpoſed in a pinnated or ſquamoſe manner, ſometimes of leaves only: the male flower ſtands on a long ſtraight pedicle, which ariſes out of a calyx growing from the upper part of the ſurface: it has neither calyx nor corolla, but conſiſts of an anthera, which is at firſt of an oval figure, but afterwards opens into four ſegments, and remains in this ſtate a long while on the plant; the female flower has no pedicle, there is no viſible calyx or corolla, but all that is ſeen is a number of ſeeds lying naked in a cluſter, and ſometimes only a ſingle one.

This is the lichenaſtrum of Dillenius, and the muſcoides of Micheli.

JUNIPER, *juniperus*, in botany, a genus of the dioecia-monadelphia claſs of plants, without any male corolla; the female flower conſiſts of three rigid and acute petals: the fruit is a roundiſh, fleſhy berry; and the ſeeds are three oblong oſſicles, convex on one ſide, and angulated on the other.

Juniper berries are to be choſen freſh, plump, full of pulp, and of a ſtrong taſte; and theſe, when uſed in medicine, are powerful attenuants, diuretics, and carminatives: they diſſolve viſcid humours in the firſt paſſages, and are conſequently a remedy for the flatulencies which theſe diſorders occaſion. They are given in caſes of the gravel and other nephritic complaints, in infarctions of the viſcera, and in ſuppreſſions of the menſes, and are often made ingredients in clyſters. The berries chewed, or the eſſential oil taken only in a few drops, give the urine the ſame ſweet violet-ſcent that it has after taking turpentine. But theſe berries are not to be given indiſcriminately; for in hot habits, they often counteract the very purpoſes intended to be anſwered by them, and their uſe ſucceeded with heat, and even ſuppreſſion of urine, flatulencies, and ſwellings of the ſtomach and inteſtines: therefore in all caſes, where there is danger of an inflammation, either in the primæ viæ, or in the kidneys, the uſe of juniper-berries is to be avoided. We keep no preparation of them in the ſhops, except the eſſential oil made by diſtillers with water in the uſual way; and this is ſeldom made at home, but the imported kind is commonly adulterated with oil of turpentine. We uſed to keep a diſtilled ſpirituous water of juniper in the ſhops, but the vulgar getting an opinion of its being a pleaſant dram, the making of it became the buſineſs not only of the apothecary, but of the diſtiller, who ſold it under the name of geneva.

JUNK, in the ſea-language, old cables cut into ſhort pieces, and given to boatſwains for making ſwabs, plats, and nippers; as alſo to the ſhip-carpenters, and to poor people, to be picked into oakam, for caulking ſhips, *&c.*

JUNO, in aſtronomy, the name by which ſome call the ſecond of jupiter's ſatellites. See the article JUPITER.

JUNTA, JUNTO, or JUNCTO, in matters of government, denotes a ſelect council for taking cognizance of affairs of great conſequence, which require ſecrecy.

In Spain and Portugal, it ſignifies much the ſame with convention, aſſembly, or board among us: thus we meet with the junta of the three eſtates, of commerce, of tobacco, *&c.* See BOARD, *&c.*

IVORY, *ebur*, in natural hiſtory, *&c.* a hard, ſolid and firm ſubſtance, of a white colour, and capable of a very good poliſh. It is the tuſk of the elephant, and is hollow from the baſe to a certain height, the cavity being filled up with a compact medullary ſubſtance, ſeeming to have a great number of glands in it. It is obſerved that the Ceylon-ivory, and that of the iſland of Achem do not become yellow in the wearing, as all other ivory does; for this reaſon the teeth of theſe places bear a larger price than thoſe of the coaſt of Guinea.

The duty on ivory, on its being imported into this kingdom, is 1 s. $11\frac{10}{100}$d. the pound, out of which a drawback of 1 s. $8\frac{25}{100}$d. the pound, is allowed on its exportation.

To ſoften IVORY *and other bones*, lay them for twelve hours in aqua fortis, and then three days in the juice of beets, and they will become ſo ſoft that they may be worked into any form. To harden them again, lay them in ſtrong vinegar. Dioſcorides ſays, that by boiling ivory for the ſpace of ſix hours with the root of mandragoras, it will become ſo ſoft that it may be managed as one pleaſes.

To ſoften and whiten IVORY, take white wine vinegar, thrice diſtilled, and boil red ſage leaves in it with a little quicklime; put in the ivory while the liquor

Fig. 1. JUPITER's MOONS.

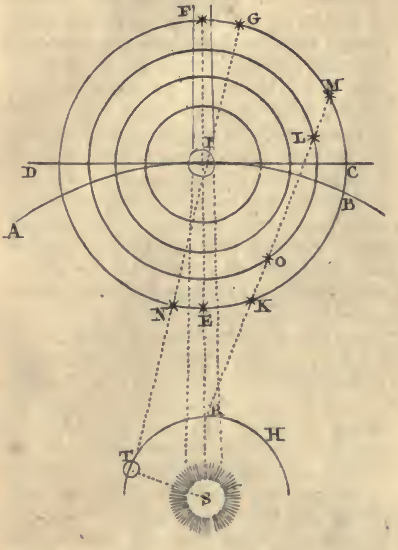


Fig. 2. An Inſtrument for making ISSUES.

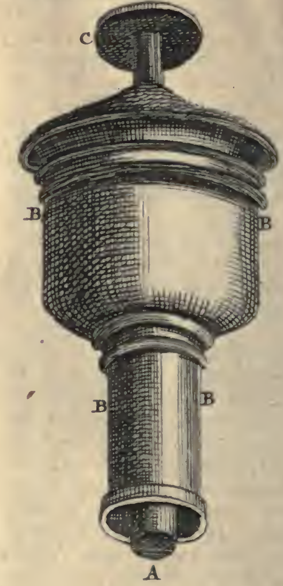


Fig. 3. KEY.

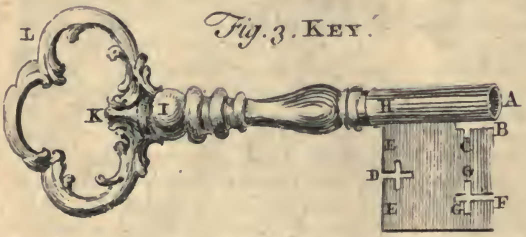


Fig. 4. KEVEL.

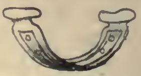
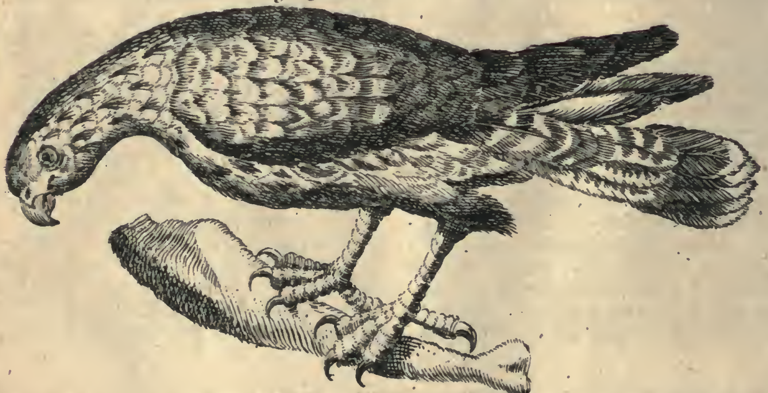


Fig. 5. KESTRIL.



J. Jefferys sculp

is boiling hot, and it will ſoon become ſofter and much whiter than it was before. Ivory may alſo be whitened and cleaned from ſpots in the following manner: lay it in quick-lime and pour a little water over it, but not too much, that the heat may not be too great, leſt it ſcale and become brittle.

Ivory diſtilled in a retort yields a ſmall quantity of an inſipid and ſcentleſs phlegm; then a larger quantity of a pungent liquor, like ſpirits of harts-horn; after this comes over a brown fœtid oil, and a moderate quantity of volatile ſalt concretes about the ſides of the receiver. Theſe have all the ſame virtues with the preparations of harts-horn; and the raſpings of ivory, in the ſame manner as the ſhavings of harts-horn, boil into a jelly with water, and have the ſame reſtorative virtues.

Staining and marbling of IVORY. 1. Of a fine coral-red; make a lye of wood-aſhes, of which take two quarts, pour it into a pan upon one pound of braſil; to this add one pound of alum; boil it for half an hour; then take it off, and put in the ivory or bone, and the longer either of theſe continue in the liquor, the redder they will be. 2. Of a fine green; take two parts of verdegreaſe, and one part of ſal-armoniac; grind them well together, pour ſtrong white wine vinegar on them, and putting your ivory into this mixture, let it lie covered till the colour has penetrated, and is as deep as you would have it. If you would have it ſpotted with white, ſprinkle it with wax; or if you would have it marbled, cover it with wax, and ſcrape it off in veins, having all the lines uncovered which you deſire to have ſtained. 3. Of black; take litharge and quick-lime, of each an equal quantity; put them in rain-water over the fire till it begins to boil; in this put the bone or ivory, ſtirring them well about with a ſtick; and afterwards, when you ſee the ivory receive the colour, take the pan from the fire, ſtirring the ivory all the while till the liquor is cold. 4. Marbling upon ivory is performed thus; melt bees-wax and tallow together, lay it over the ivory, and with an ivory bodkin open the ſtrokes that are to imitate marbling; pour the ſolution of ſome metal on them, and when it has ſtood a ſhort time, pour it off; when it is dry, cover the ſtrokes again with wax, and open ſome other veins with your bodkin for another metallic ſolution; and this repeat to the number of colours you deſign to give it. The ſolution of gold gives it a purple; of copper, a green; of ſilver, a lead-black; of iron, a yellow and brown. By this method you may alſo imitate tortoiſe-ſhell and ſeveral other ſubſtances on ivory.

IVORY-BLACK. See *Ivory* BLACK.

JUPITER, ♃, in aſtronomy, one of the ſuperior planets, remarkable for its great brightneſs. See the articles PLANET and COPERNICAN SYSTEM.

Jupiter appears almoſt as large as Venus, but is not altogether ſo bright; he is eclipſed by the moon, by the ſun, and even by mars. He has three appendages, called zones, or belts, which Sir Iſaac Newton thinks are formed in his atmoſphere. In theſe are ſeveral *maculæ*, or ſpots; from whoſe motion the motion of jupiter round its axis is ſaid to have been firſt determined. See plate CXLVIII. fig. 3. Its orbit is ſituated between thoſe of ſaturn and mars, and is therefore called one of the ſuperior planets: it has a rotation round its axis in 9 hours 56 minutes; and a periodical revolution round the ſun in 4332 days, 12 hours, 20′, 9″. It is the biggeſt of all the planets; its diameter to that of the ſun appears, by aſtronomical obſervations, to be as 1077 is to 10000; to that of ſaturn, as 1077 to 889; to that of the earth, as 1077 to 104. The force of gravity on its ſurface is to that on the ſurface of the ſun, as 797.15 is to 10000; to that of ſaturn, as 797.15 to 534.337; to that of the earth, as 797.15 to 407.832. The denſity of its matter is to that of the ſun, as 7404 to 10000; to that of ſaturn, as 7404 to 6011; to that of the earth, as 7404 to 3921. The quantity of matter contained in its body is to that of the ſun as 9.248 to 10000; to that of ſaturn, as 9.248 to 4.223; to that of the earth, as 9.248 to 0.0044.

The mean diſtance of jupiter from the ſun is 5201 of thoſe parts, whereof the mean diſtance of the earth from the ſun is 1000, though Kepler makes it 5196 of thoſe parts. Mr. Caſſini calculates jupiter's mean diſtance from the earth to be 115000 ſemidiameters of the earth. Gregory computes the diſtance of jupiter from the ſun to be above five times as great as that of the earth from the ſun; whence he gathers, that the diameter of the ſun, to an eye placed in jupiter, would not be a fifth part of what it appears to us; and therefore his diſk would be twenty-five times leſs, and his light and heat in the ſame proportion.

The inclination of jupiter's orbit, that is, the angle formed by the plane of its orbit, with the plane of the ecliptic, is 1° 20′; his excentricity in 250; and Huygens computes his ſurface to be four hundred times as large as that of the earth.

As jupiter is one of the three ſuperior planets, that is, one of the three which are above, or without, the orbit of the earth: hence it has no parallax, its diſtance from the earth being too great to have any ſenſible proportion to the diameter of the earth. Tho' it be the greateſt of all the planets, yet its revolution about its axis is the ſwifteſt. Its polar axis is obſerved to be ſhorter than its equatorial diameter; and Sir Iſaac Newton determines the difference to be as 8 to 9; ſo that its figure is a ſpheroid, and the ſwiftneſs of its rotation occaſions this ſpheroidiſm to be more ſenſible than that of any other of the planets.

Jupiter has four moons, or ſatellites, that attend him, which, at different diſtances, and with different periods, perform conſtant revolutions round him; that which is next to him, is no further removed than $2\frac{5}{6}$ of his own diameters, and turns round in 1 day, 18 hours and an half. The ſecond, at the diſtance of $4\frac{1}{2}$ diameters, deſcribes its orbit in the ſpace of 3 days and 13 hours. The third is removed from jupiter 7 of his diameters, and finiſhes its circulation in ſeven days 4 hours. The furthermoſt completes its period in the ſpace of 16 days, $16\frac{1}{2}$ hours, at the diſtance of 12 diameters of jupiter. Theſe *jovial* planets were firſt diſcovered by Galileo, by the help of the teleſcope which he firſt invented; and by them he increaſed the number of the celeſtial bodies, and called them medicean ſtars, in honour of the dukes of Tuſcany, with whoſe name he dignified them.

The orbits of jupiter's moons lie nearly in the plane of the ecliptic, which is the reaſon why their motion is apparently in a right line, and not circular, as it really is. To underſtand this, let S (plate CXLIX. fig. 1) be the ſun, T the earth in its orbit T H, I the planet jupiter in his orbit A I B, and in the center of the four orbits of his moons. Then, becauſe the plane of thoſe orbits does nearly paſs through the eye, the real motion of the ſatellite in the periphery will be apparently in the diameter of the orbit, which is at right angles to the line joining the center of the earth and jupiter.

Thus ſuppoſing the earth at R, if D C be drawn through the center of jupiter perpendicular to R I, the motion of each moon and their places will appear to be in that line. Thus, if the exterior moon be at E or F, it will appear to be at I either upon or behind the center of jupiter; if the moon move from E to K, it will appear to have moved from I to L; and when it moves from K to C, it will appear to move from L to C. Again, while the ſatellite moves from C to M, it will appear to move from C to L; and as it goes from thence to F, it apparently moves from L to I. Thus alſo, on the other ſide of the orbit, while the ſatellite deſcribes the quadrant F D, its apparent motion will be from I to D; and then from D to I again, as it comes from D to E.

Whence, ſince this is the caſe of each ſatellite, it appears, that while each ſatellite deſcribes the remote half of its orbit CFD, its apparent motion will be direct, or from weſt to eaſt along the line C D; and while it deſcribes the other half DEC, its apparent motion is retrograde, or from eaſt to weſt back again along the ſame line from D to C; ſo that each ſatellite traverſes the diameter of its orbit twice in each revolution.

Theſe four moons muſt make a very pleaſing ſpectacle to the inhabitants of jupiter, if there are any; for ſometimes they riſe altogether, ſometimes they are all in the meridian, ranged one under another; and ſometimes all appear in the horizon, and frequently undergo eclipſes; the obſervations whereof are of ſpecial uſe in determining the longitude.

The day and night are of the ſame length in jupiter all over his ſurface, *viz.* five hours each; the axis of his diurnal rotation being nearly at right angles to the plane of his annual orbit. Though there be four primary planets below jupiter, yet an eye placed on his ſurface would never perceive any of them; unleſs, perhaps, as ſpots paſſing over the ſun's diſk, when they happen to come between the eye and the ſun. The parallax of the ſun, viewed from jupiter, will ſcarce be ſenſible; no more than that of ſaturn, neither being much above twenty ſeconds; ſo that the ſun's apparent diameter in jupiter will not be above ſix minutes. The outermoſt of his ſatellites will appear almoſt as big as the moon does to us; *viz.* five times the diameter and twenty-five times the diſk of the ſun. Doctor Gregory adds, that an aſtronomer in jupiter would eaſily diſtinguiſh two kinds of planets, four nearer him, *viz.* the ſatellites; and two, *viz.* the ſun and ſaturn, more remote: the former however, will fall vaſtly ſhort of the ſun in brightneſs, notwithſtanding the great diſproportion in the diſtances and apparent magnitude. From theſe four different moons, the inhabitants of jupiter will have four different kinds of months, and the number of moons in their year will not be leſs than 4500. Theſe moons are eclipſed as often as, being in oppoſition to the ſun, they fall within the ſhadow of jupiter: and again, as often as, being in conjunction with the ſun, they project their ſhadows to jupiter, they make an eclipſe of the ſun to an eye placed in that part of jupiter where the ſhadow falls. But in regard the orbits of theſe ſatellites are in a plane which is inclined to, or makes an angle with, the plane of jupiter's orbit, their eclipſes become central when the ſun is in one of the nodes of theſe ſatellites; and when out of this poſition, the eclipſes may be total, though not central, becauſe the breadth of jupiter's ſhadow is nearly decuple to that of the breadth of any of the ſatellites; and the apparent diameter of any of theſe moons is nearly quintuple the apparent diameter of the ſun. It is owing to this remarkable inequality of diameters, and the ſmall inclination the plane of the orbits of the ſatellites has to the plane of jupiter's orbit, that in each revolution there happen eclipſes both of the ſatellites and of the ſun; though the ſun be at a conſiderable diſtance from the nodes. Further; the inferior among theſe ſatellites, even when the ſun is at the greateſt diſtance from the nodes, will occaſionally eclipſe and be eclipſed by the ſun to an inhabitant of jupiter; though the remoteſt of them, in this caſe, eſcapes falling into jupiter's ſhadow, and jupiter into his, for two years together. To this it may be added, that one of theſe ſatellites ſometimes eclipſes another where the phaſis muſt be different, nay frequently oppoſite to that of the ſatellite falling into the ſhadow of jupiter juſt mentioned; for in this the eaſtern limb immerges firſt, and the weſtern immerges laſt; but, in the others, it is juſt the reverſe. The ſhadow of jupiter, though it reaches far beyond its ſatellites, yet falls much ſhort of the diſtance of any planet; nor could any other planet, ſaturn alone excepted, be immerged in it, even though it were infinite. Nor could the ſhadow of jupiter reach that of ſaturn, unleſs jupiter's diameter were half of that of the ſun; whereas, in effect, it is not one ninth of it. The courſes of jupiter's ſatellites, and their various eclipſes, would render navigation very ſure and eaſy on the globe of jupiter. Even we, at this diſtance, can make very good uſe of them: thoſe eclipſes being found one of our beſt means for determining the longitude at ſea. See LONGITUDE.

JUREA, or JURA, a ſtrong city in Italy, in the province of Piedmont, ſituated on the river Doria, ſubject to the king of Sardinia: eaſt long. 7°, 36′; north lat. 45°, 22′.

JURISDICTION, in law, ſignifies the power and authority with which any perſon is inveſted in adminiſtring juſtice in caſes of complaint laid before him.

Juriſdictions are either eccleſiaſtical or ſecular; eccleſiaſtical belongs to biſhops and their deputies. See BISHOP.

Secular juriſdiction belongs to the king and his judges. The courts and judges at Weſtminſter are not reſtrained to any county or place, they having juriſdiction all over England; but other courts are confined to their particular juriſdictions, which if they go beyond, all their proceedings become erroneous. As to inferior juriſdictions, they are of ſeveral ſorts; one of which is to hold pleas, and the plaintiff may either ſue there or in the king's courts. Another is the conuſance of pleas; where a right is inveſted in the lord of the franchiſe to hold pleas. A third kind is an exempt juriſdiction, as where the king grants to the inhabitants of a particular city or corporation, the privilege of being ſued only within their own city, &c.

JURISPRUDENCE, the ſcience of what is juſt or unjuſt; or the knowledge of laws, rights, cuſtoms, ſtatutes, &c. neceſſary for the adminiſtration of juſtice.

JURIS UTRUM, in law, a writ in behalf of a clergyman whoſe predeceſſor has alienated the lands belonging to his church. This writ is alſo granted in order to try whether free alms belong to a church where they are transferred. A ſucceſſor of a deceaſed clergyman may alſo have this writ againſt a man, who intrudes into lands and tenements; a vicar may alſo have this writ even againſt the parſon, for the glebe of his vicarage, *&c.*

JUROR, in law, ſignifies any perſon ſworn on a jury. See the next article.

JURY, a certain number of men ſworn to enquire into and try a matter of fact, and to declare the truth upon ſuch evidence as ſhall appear before them.

Juries are, in theſe kingdoms, the ſupreme judges in all courts and in all cauſes in which either the life, property or reputation of any man is concerned: this is the diſtinguiſhing privilege of every Briton, and one of the moſt glorious advantages of our conſtitution; for as every one is tried by his peers, the meaneſt ſubject is as ſafe and as free as the greateſt.

All criminal cauſes muſt firſt be tried by a grand jury, which commonly conſiſts of twenty-four men of greater note than the petit jury, who are choſen indifferently out of the whole county, and no man can ſuffer the diſgrace of being tried in any ignominious cauſe, without their firſt finding him guilty; if they find him innocent, he is immediately diſcharged; but if otherwiſe, they only find an indictment, on which he is tried, and finally acquitted or convicted by the verdict of the petit jury, who are not only to be returned from the county where the fact was done, but near neighbours, ſuch as are moſt ſufficient and leaſt ſuſpicious; to prevent partiality, the names of the perſons impannelled are wrote on ſeveral pieces of paper of equal ſize, and delivered by the under-ſheriff to the judge's Marſhal, who cauſes them to be rolled up, all in the ſame manner, and put together in a box, and when any cauſe is brought to trial, ſome indifferent perſon is to draw out twelve of theſe papers, and the perſons whoſe names are drawn, if not challenged, are to be the jury to try the cauſe; and in caſe any are challenged, and ſet aſide, or do not appear, then a further number is to be drawn till there is a full jury. See the article CHALLENGE.

When a jury-man is ſworn, he muſt not depart from the bar on any account whatſoever till the evidence is given, without leave of the court; and if that be obtained, he muſt have a keeper with him. As ſoon as the whole evidence is ſummed up, the jury are to be kept together till they are all of one mind, and unanimous in bringing in their verdict, without being admitted to the ſpeech of any perſon, and without meat, drink, fire or candle. They are fineable if they agree to caſt lots for their verdict, and alſo for being tampered with in relation to it. But as they are the ſole judges of the fact, they are not fineable for giving a verdict contrary to the ſentiments of the court; nor even for giving it contrary to what may appear plain evidence, becauſe the law preſumes that they may have ſome other evidence beſides what is given in court: but where any corruption appears, a jury may be attainted for going contrary to evidence; and if a juror takes any thing either of the plaintiff or defendant for giving a verdict, he is to pay ten times as much as he has taken, or ſuffer a year's impriſonment; yet in trying cauſes, juries are to have their charges allowed them by the court. In all caſes of difficulty, it is ſafeſt for the jury to find the ſpecial matter, and to leave it to the judges to determine how the law ſtands upon the fact.

Infants, perſons of ſeventy years of age, and upwards, clergymen, apothecaries, *&c.* are exempted from ſerving upon juries; and barons, and all above them, are not to ſerve in an ordinary jury.

Jurors, in London, muſt not only be houſekeepers, but muſt have land or goods worth one hundred pounds; and they may be examined on oath as to that point. 3 Geo. II. c. 25.

The qualifications of a jury-man for a county, is ten pounds *per annum*, either in freehold or copyhold-eſtate within the ſame county; but cities, boroughs, and corporate towns, are excepted by the ſtatutes: however, no jury is obliged to appear upon a trial at Weſtminſter where the offence was committed thirty miles off, except it be required by the king's attorney-general. According to uſage, the ſheriff ſhould return twenty-four jurors, in order to ſpeed the trial in caſe of challenge, ſickneſs, *&c.* and ſhould he only return twelve, purſuant to the the writ, he is liable to be amerced. By 4 and 5 W. and M. no ſheriff, bailiff, *&c.* under the penalty of ten pounds, ſhall return any perſon to ſerve on a jury, who has not been duly ſummoned ſix days before his appearance, nor under the like penalty ſhall he accept of money or other reward for excuſing the appearance of a juryman: jurymen neglecting to appear, ſhall be fined in a ſum not exceeding five pounds, nor leſs than forty ſhillings; except they can give a reaſonable excuſe for their non-appearance: and, in caſe a juryman does appear, but refuſes to be ſworn, or to give a verdict, an attachment may be iſſued againſt him. Liſts of jurors, according to the ſtatutes of 4 and 5 W. and M. and 7 and 8 W. III. are now to be made from the rates of each pariſh, and fixed on the doors of churches, &c. twenty days before Michaelmas, that public notice may be given of perſons omitted who are qualified, or of perſons inſerted who are not ſo. after which, the liſts being ſettled by the juſtices of the peace at the quarter-ſeſſions, duplicates are to be delivered to the ſheriffs by the clerks of the peace; and the names contained in theſe liſts muſt be entered alphabetically by the ſheriffs in a book to be kept for that purpoſe, together with their additions and places of abode. The ſheriffs are liable to be fined for returning other perſons; and alſo if they return jurors that have ſerved two years before. Sheriffs, on the return of writs of *venire facias*, are to annex a pannel of the names of a competent number of jurors, mentioned in the liſts, and not leſs than forty-eight in any county, nor more than ſeventy-two, unleſs they are otherwiſe directed by the judges, which jurors ſhall be ſummoned to ſerve at the aſſizes, &c.

When it is conceived that an indifferent and impartial jury will not be returned by the ſheriff, a ſpecial jury is allowed; in which caſe the court, upon a motion made, will order the ſheriff to attend the ſecondary of the king's bench with his book of freeholders of the county, and the ſecondary is to mark a jury, in the preſence of the attornies on both ſides: alſo, if a cauſe of conſequence is to be tried, the court of king's bench, on a motion upon an affidavit made, will make a rule for the ſecondary to name forty-eight freeholders, out of which each party is to ſtrike out twelve, one at a time, the plaintiff's attorney beginning firſt, and the remainder of the jurors will be the jury for the trial: though the nomination of a ſpecial jury ought to be in the preſence of the attornies on each ſide; yet in caſe either of them neglects, or refuſes to attend, the ſecondary may proceed, and ſtrike out twelve for the attorney that makes default. By 3 G. II. c. 25. on the motion of the proſecutor, plaintiff or defendant, on trials of iſſues on indictments, and in all actions whatſoever, the courts of Weſtminſter are authoriſed to order a ſpecial jury to be ſtruck in the ſame manner as upon trials at bar. Where a ſpecial jury is ordered by a rule of court, in any cauſe ariſing in a city, corporation, &c. this jury is to be taken out of the liſts or books of the perſons qualified, which are to be produced by the ſheriffs, &c. before the proper officer. The ſame indulgence is granted both to merchants and foreigners; for where two merchants are plaintiff and defendant, the court may be moved for a jury of merchants to try the iſſue between them; and if either of the parties in the ſuit be an alien, the jury, at the deſire of the party, is to be compoſed of half foreigners and half Engliſh. See the articles PEER and VERDICT.

JURY-MAST, whatever is ſet up in room of a maſt that has been loſt in a ſtorm or in an engagement, and to which a leſſer yard, ropes and ſails are fixed.

JUS, in its general acceptation, ſignifies law or right.

JUS ACCRESCENDI, in law, is the right of ſurvivorſhip between two joint tenants.

JUS CORONÆ, ſignifies, in general, the rights of the crown. Theſe are a part of the laws of the kingdom, though they differ in many things from the general laws relating to the ſubject. See the article KING.

JUS DUPLICATUM, in law, is a double right, and is uſed when a perſon has the poſſeſſion of a thing, as well as a right to it.

JUS GENTIUM, the law of nations, or the laws eſtabliſhed between different kingdoms and ſtates, in relation to each other. See the article LAW.

JUS HEREDITATIS, the right or law of inheritance.

JUS PATRONATUS, in the cannon law, is the right of preſenting a clerk to a benefice; or a kind of commiſſion granted by the biſhop to enquire who is the rightful patron of a church. This commiſſion is directed to ſix clergymen, and ſix laymen who reſide near the church, and theſe are to enquire. 1. Whether the church is void? 2. Who made the laſt preſentation? 3. Who is the rightful patron? &c. See the article PATRON.

JUS POSSESSIONIS, in law, is a right of ſeiſin or poſſeſſion, as jus proprietatis is the right of ownerſhip of lands, &c.

JUS PRESENTATIONIS, in law, the right a patron enjoys of preſenting his clerk to the ordinary, to be admitted, inſtituted, and inducted into a church.

JUS RECUPERANDI, INTRANDI, &c. ſignify a right of recovering and entering into lands, &c.

JUSSIÆA, or **JUSSIEUA**, the *Catalonian Jaſmine*, in botany, a genus of the decandria-monogynia claſs of plants, the corolla whereof conſiſts of five roundiſh, patent petals; the fruit is oblong, thick, coronated, and opens longitudinally; the ſeeds are numerous, and diſpoſed in ſeries.

JUST, a ſportive combat on horſeback, man againſt man, armed with lances.

The difference between juſts and tournaments, according to Du Cange, conſiſts in this, that the latter is a genus of which the former is only a ſpecies. Tournaments included all kinds of military ſports and engagements, which were made out of gallantry and diverſion. Juſts were thoſe particular combats, where the parties were near each other, and engaged with lance and ſword: add, that the tournament was frequently performed by a number of cavaliers, who fought in a body; whereas the juſt was a ſingle combat of one man againſt another. Though the juſts were uſually made in tournaments, after a general rencounter of all the cavaliers, yet they were ſometimes ſingly and independent of any tournament.

Antiently juſts and tournaments made a part of the entertainment of all ſolemn feaſts and rejoicings. The Spaniards borrowed theſe exerciſes from the Moors, and call them *juego de cannus*, reed or cane-plays. Some take them to be the ſame with the *ludus trojanus*, antiently practiſed by the youth of Rome.

He who appeared for the firſt time at a juſt, forfeited his helmet, or caſque, unleſs he had forfeited before at a tournament.

JUSTICE, *juſtitia*, in a moral ſenſe, is one of the four cardinal virtues, which gives every perſon his due.

JUSTICE, *juſticiarius*, in a legal ſenſe, a perſon deputed by the king to adminiſter juſtice to his ſubjects, whoſe authority ariſes from his deputation, and not by right of magiſtracy.

In the courts of king's bench and common pleas there are two judges ſtiled juſtices, each of whom retains the title of lord during the time of his continuing in office. The firſt of theſe, who is ſtiled lord chief juſtice of England, has a very extenſive power and juriſdiction in pleas of the crown, and is particularly intruſted not only with the prerogatives of the king, but likewiſe the liberty of the ſubject. He hears all pleas in civil cauſes brought before him in the court of king's bench, and alſo the pleas of the crown: while, on the other hand, the lord chief juſtice of the common pleas has the hearing of all civil cauſes between common perſons. Beſides the lords chief juſtices, there are ſeveral other juſtices appointed by the king for the execution of the laws; ſuch as the lords juſtices in eyre of the foreſts, who are two juſtices appointed to determine all offences committed in the king's foreſts; juſtices of aſſize, who, by a ſpecial commiſſion, were formerly ſent to hear cauſes in this or that county, for the eaſe of the ſubject; and theſe judges continue twice a year to paſs the circuits by two and two throughout all England, diſpatching the different buſineſs they meet with by different commiſſions; for they have one commiſſion to take aſſizes, another of oyer and terminer, that is, to hear and determine cauſes, and another of goal-delivery: from whence they are called juſtices of oyer and terminer, of goal delivery, &c. They are alſo called juſtices of niſi prius, and ſo denominated from the words uſed in a common form of adjournment of a cauſe in the court of common pleas. See NISI PRIUS.

JUSTICES *of the peace*, are perſons appointed by the king's commiſſion to keep the peace of the county in which they reſide; and ſome of theſe, who are of ſuperior rank or quality, are called juſtices of the quorum, and without the preſence or aſſent of theſe, or at leaſt one of them, no buſineſs of importance can be diſpatched. Juſtices of the peace ought to be appointed out of the moſt ſufficient perſons in the county, as well as thoſe of the greateſt reputation. They ought to poſſeſs an eſtate of at leaſt 100 l. *per annum*, in freehold or copyhold, for life, or for the term of twenty-one years, without incumbrances; and if a juſtice of the peace, not thus qualified, preſumes to act in that office, he is liable to the penalty of 100 l. Every juſtice of the peace has a ſeparate authority for doing all the different acts relating to his office, as for commitments, binding to the good behaviour, &c. they are authorized to take informations againſt perſons committing treaſon, to grant warrants for apprehending them, and committing them to priſon : they may alſo commit all felons in order to bring them to trial; and at the ſame time, they are to bind over the accuſers to proſecute at the aſſizes: and if they neglect to certify ſuch examinations and informations at the next goal-delivery, or do not bind over the proſecutors, they are liable to be fined. Where any perſon is eſteemed dangerous, and likely to break the peace, a juſtice may require a recognizance with a large penalty of ſuch perſon for his keeping the peace, and on his not procuring ſureties for his good behaviour, he may ſend him to priſon: but where a perſon hears of a peace-warrant being out againſt him, he may go to another juſtice, and there give ſurety of the peace, by which means he will prevent his being held on the firſt warrant. Juſtices of the peace frequently make up petty quarrels and breaches, where the king is not intitled to a fine; but they are not to take money for making agreements: if a juſtice is guilty of any miſdemeanor, an information will lie againſt him in the king's bench, where he may be puniſhed by fine and impriſonment. Two or more juſtices of the peace have power jointly to take indictments, and try offenders at the quarter-ſeſſions: and in many caſes they are impowered, by ſtatute, to act where their commiſſion does not extend: they are to hold their ſeſſions four times a year, on the firſt week after Epiphany, Eaſter, St. Thomas a Becket, which is the 7th of July, and Michaelmas: at the quarter-ſeſſions they may try perſons for petit-larceny, and other ſmall felonies; but felonies of a higher nature are to be tried at the aſſizes.

JUSTICES *within liberties*, are juſtices of the peace who have the ſame authority in cities or other corporate towns, as the others have in counties, and their power is the ſame, only theſe laſt have the aſſize of ale and beer, wood and victuals, *&c.*

JUSTICE-SEAT, is the higheſt foreſt court, always held before the lord chief juſtice in eyre of the foreſt; in which court fines are ſet for offences, and judgments given.

JUSTICIA, in botany, a genus of the diandria-monogynia claſs of plants, the corolla whereof conſiſts of a ſingle petal; the tube is gibbous; the limb ringent; the upper lip is oblong and emarginated; the lower lip is of the ſame length with that, and is reflex and obtuſely trifid: the fruit is an oblong, obtuſe capſule, narrow at the baſe, compoſed of two valves, and containing two cells; the partition placed contrarywiſe to the valves, opens by an elaſtic ungues: the ſeeds are roundiſh.

JUSTICIAR, in our old laws, an officer inſtituted by William the conqueror, as the chief officer of ſtate, who principally determined in all caſes civil and criminal. He was called in latin *capitalis juſticiarius totius angliæ.*

JUSTICIARY, or *court of* JUSTICIARY, in Scotland, a court of ſupreme juriſdiction in all criminal caſes.

This court came in place of the juſtice-eyre or juſtice-general, which was laſt in the perſon of the earl of Argyle, who tranſacted for it with king Charles I. but being made juſtice-general of all the iſlands, which gave riſe to great debates between him and ſome hereditary ſheriffs there, that juriſdiction was taken away by parliament in 1672, and was erected into a juſtice or criminal court, conſiſting of a juſtice-general alterable at the monarch's pleaſure, juſtice-clerk, and five other judges, who are lords of the ſeſſion. This court commonly ſits upon Mondays, and has one ordinary clerk, who has his commiſſion from the juſtice-clerk. They have four macers, and a doomſter appointed by the lords of the ſeſſion.

The form of the proceſs is this: the clerk raiſes a libel or indictment upon a bill paſſed by any of the lords of that court, at the inſtance of the purſuer, againſt the defendant or criminal, who is immediately committed to priſon after citation. When the party, witneſſes, great aſſize, or jury of forty-five men, are cited, the day of compearance being come, fifteen of the great aſſize is choſen to be the aſſize upon the pannel, or priſoner at the bar. The aſſize ſits with the judges to hear the libel read, witneſſes examined, and the debates on both ſides, which is written verbatim in the adjournal books. The king's advocate pleads for the purſuer, being the king's cauſe, and other advocates for the pannel. The debates being cloſed, the judges find the libel or indictment either non-relevant, in which caſe they deſert the diet, and aſſoil or abſolve the party accuſed; or, if relevant, then the aſſize or jury of fifteen is removed into a cloſer room, none being preſent with them, where they chooſe their chancellor and clerk, and conſider the libel, depoſition, and debates; and bring in their verdict of the pannel ſealed guilty or not guilty: if not guilty, the lords abſolve; if guilty, they condemn and declare their ſentence of condemnation, and command the ſentence to be pronounced againſt the pannel by a macer and the mouth of the doomſter.

The lords of the juſticiary, likewiſe go circuits twice a year into the country. See the article CIRCUIT.

JUSTICIES, a writ directed to a ſheriff, by virtue of which he is impowered to hold a plea of debt in his county-court for a ſum above 40 s. tho' by his ordinary power he has only cognizance of ſums under 40 s.

JUSTIFICATION, in law, ſignifies a maintaining, or ſhewing a ſufficient reaſon in court, why the defendant did what he is called to anſwer. Pleas in juſtification muſt ſet forth ſome ſpecial matter: thus, on being ſued for a treſpaſs, a perſon may juſtify it by proving, that the land is his own freehold; that he entered a houſe, in order to apprehend a felon; or by virtue of a warrant, to levy a forfeiture; or, in order to take a diſtreſs; and in an aſſault, that he did it out of neceſſity.

JUTES, the antient inhabitants of Jutland, in Denmark.

JUTLAND, a peninſula of Denmark, antiently called the Cimbrian Cherſoneſe, ſituated between 8° and 11° of eaſt long. and between 55° and 58° of north lat. bounded by the Categate ſea, which ſeparates it from Norway, on the north; by the ſame ſea, which divides it from the daniſh iſlands and Sweden, on the eaſt; by Holſtein, on the ſouth; and by the German ocean, on the weſt. It is divided into north and ſouth Jutland; the ſouth being uſually called Sleſwic. The whole is about 180 miles in length, and 90 in breadth.

IVY, *hedera*, in botany, a genus of the pentandria-monogynia claſs of plants, the corolla whereof conſiſts of five oblong, patent petals, with their points bent: the fruit is a globoſe berry, having only one cell: the ſeeds are five in number, large, gibbous, and angulated on one part.

The qualities of this plant, in medicine, are drying and aſtringent; but it is rarely taken inwardly; it is more frequently uſed externally, for drying and healing achores: the berries are frequently given by the common people as a febrifuge: they purge up and down. A gum that diſtils from the trunk of the ivy-tree, upon being any ways cut, is reckoned a notable cauſtic, and is ſaid to deſtroy the nits of the head.

Ground-IVY, *hedera terreſtris*. See the article GROUND-IVY.

IXIA, CHAMÆLEON THISTLE, in botany, a genus of the triandria-monogynia claſs of plants, the corolla whereof conſiſts of ſix oblong, equal, lanceolated petals: the fruit is a roundiſh, triquetrous capſule, compoſed of three valves, and containing three compreſſed cells, in each of which is a ſingle roundiſh ſeed.

IXORA, in botany, a genus of the tetrandria-monogynia claſs of plants, the corolla whereof conſiſts of a ſingle petal; the tube is cylindric, very long and ſlender; the limb is plane, and divided into four oval ſegments; the fruit is a berry of a roundiſh figure, with only one cell: the ſeeds are four in number, convex on one ſide, and angular on the other.

JYNX, the WRY-NECK, in ornithology, a genus of bird of the pye-kind, the beak of which is ſmooth, and the noſtrils hollowed: the tongue is very long, and of a rounded form, reſembling a worm: the toes are four in number, two before and two behind.

Of this genus there is only one known ſpecies, called, from its ſingular manner of twiſting its head about, the wry-neck. It is about the ſize of a lark, and is called by authors jynx, torquilla, turbo, &c.

K.

K, or k, the tenth letter, and ſeventh conſonant of our alphabet; being formed by the voice, by a guttural expreſſion of the breath through the mouth, together with a depreſſion of the lower jaw, and opening of the teeth.

Its ſound is much the ſame with that of the hard *c*, or *qu*; and it is uſed, for the moſt part, only before *e*, *i*, and *n* in the beginning of words; as *ken*, *kill*, *know*, &c. It uſed formerly to be always joined with *c* at the end of words, but is at preſent very properly omitted: thus, for *publick*, *muſick*, &c. we ſay, *public*, *muſic*, &c. However, in monoſyllables, it is ſtill retained, as *jack*, *block*, *mock*, &c.

Tho' it is ſeldom uſed in words derived from the French, as being altogether wanting in that language, yet we meet with *riſk*, *burleſk*, &c. in very good authors inſtead of *riſque*, *burleſque*: and, indeed, the former orthography is certainly moſt agreeable to the genius of the engliſh language.

The letter *k* is derived from the greek kappa, Κ or κ; it being unknown to the Romans, tho' we ſometimes meet with kalendæ inſtead of calendæ.

As a numeral, K denotes 250; and with a line over it, $\overline{\text{K}}$ 250000.

KAABA, or CAABA. See CAABA.

KABBALA, or CABBALA. See the article CABBALA.

KADARI, or CADARI. See CADARI.

KÆMPFERIA, in botany, a genus of the monandria-monogynia claſs of plants, the flower of which conſiſts of a ſingle petal, with a long ſlender tube, and the limb is divided into ſix ſegments: the fruit is a roundiſh and ſomewhat trigonal capſule with three cells, each containing a conſiderable number of ſeeds.

The roots of this plant are the galangals of the ſhops. See GALANGALS.

KAFFA, or CAFFA. See CAFFA.

KAKENHAUSEN, a city of Livonia, ſubject to Ruſſia; eaſt long. 26°, north lat. 57°.

KALENDAR and KALENDS. See the articles CALENDAR and CALENDS.

KALI, GLASSWORT, in botany, a genus of the pentandria-digynia claſs of plants, which has no corolla or flower-petals: the fruit is a globoſe, unilocular capſule, covered by the cup, and containing a ſingle, large, and ſpiral ſeed.

Of the aſhes of kali is made ſoap, glaſs, alkali-ſalt, potaſh, *&c.* See the articles SOAP, GLASS, *&c.*

The method of preparing it is this: when dry, they burn it in certain pits, dug in the ground, which are cloſe covered up with earth, ſo that no air can come at the fire: by this means the matter is not only reduced to aſhes, but made into a very hard ſtone, like rock-ſalt, which they are forced to break with hammers to get it out. The beſt ſort is in little dry ſtones, of a blueiſh grey colour, and full of little eyes or holes. See the article ALKALI.

KALIPH, or CALIPH. See the articles CALIPH and CALIPHATE.

KALLO, a town of upper Hungary, ſituated in a lake twenty miles ſouth eaſt of Tockay.

KALMIA, in botany, a genus of the decandria-monogynia claſs of plants, the calyx of which is a ſmall permanent perianthium, cut into four oval, acute ſegments; the corolla conſiſts of a bell-ſhaped ſingle petal; the fruit is a globular depreſſed capſule, containing five cells ſeparated by five valves, in which are a great number of ſeeds.

KALMINECK, a city of Poland, in the province of Upper Podolia, and palatinate of Kamineck, ſituated on the frontiers of Moldavia: eaſt long. 26° 30′, north lat. 48°.

KANISHIA, a town ſituated on the river Drave, in Lower Hungary, 100 miles ſouth-weſt of Buda: eaſt long. 17° 6′, north lat. 47°.

KANOF, or KANIOW, a town of Ruſſia, ſituated on the river Nieper, in the Ukrain, ſeventy miles ſouth-eaſt of Kiow: eaſt long. 32°, north lat. 50°.

KAOLIN, one of the ſubſtances whereof china-ware is made; being no other than a kind of talc reduced to powder, and made into a paſte with water.

The peculiar property of kaolin is, that it is very difficultly, if at all vitrifiable: ſo that being mixed with petunſe, a ſubſtance eaſily vitrifiable, the mixture produces a ſemi-vitrification in the fire, which is what we call china or porcelain. See the article PORCELAIN.

Talc, therefore, ſeems the only ſubſtance capable of ſupplying the place of kaolin, in the manufacture of european porcelain; as being not only very difficultly vitrified, but keeping its tranſparence after the action of the moſt violent fire.

KASTRIL, or KESTRIL. See the article KESTRIL.

KAUSBEUREN, an imperial city of Germany, thirty-two miles ſouth of Augſburg: eaſt long. 10° 45′, north lat. 47° 50′.

KEBLA, an appellation given by the mahometans to that part of the world where the temple of Mecca is ſituated, towards which they are obliged to turn themſelves when they pray.

KECKLE, or KECKLING, in the ſea-language, is the winding of old ropes about cables, to prevent them from galling.

KEDGE ANCHOR, a ſmall one uſed in kedging. See the next article.

KEDGING, in the ſea-language, is when a ſhip is brought up or down a narrow river by means of the tide, the wind being contrary. To do this, they uſe to ſet their fore-courſe, or fore top ſail and miſen, that ſo they may flat her about; and if ſhe happens to come too near the ſhore, they let fall a kedge-anchor, with a hawſer faſtened to it from the ſhip, in order to turn her head about; which work is called kedging.

KEEL, the loweſt piece of timber in a ſhip, running her whole length from the lower part of her ſtem to the lower part of her ſtern poſt. Into it are all the lower futtocks faſtened; and under part of it, a falſe keel is often uſed.

KEELERS, among ſeamen, are ſmall tubs, which hold ſtuff for the caulking of ſhips.

KEELSON, a principal timber in a ſhip, fayed within-ſide croſs all the floor-timbers; and being adjuſted to the keel with ſuitable ſcarfs, it ſerves to ſtrengthen the bottom of the ſhip.

KEEPER *of the foreſt*, an officer that has the chief management of every thing belonging to a royal foreſt, as well as the government of all the other officers. See the article FOREST.

KEEPER *of the great ſeal*, is a lord by his office, is ſtiled lord-keeper of the great ſeal of Great-Britain, and is always one of the privy-council. All grants, charters and commiſſions of the king under the great ſeal, paſs through the hands of the lord keeper, for without that ſeal, many of thoſe grants, *&c.* would be of no force; the king being, in the interpretation of the law, a corporation, and therefore paſſes nothing but by the great ſeal, which is alſo ſaid, to be the public faith of the kingdom, being in the higheſt eſteem and reputation.

Whenever there is a lord-keeper, he is inveſted with the ſame place, authority, preheminence, juriſdiction, or execution of laws, as the lord chancellor of Great-Britain is veſted with.

The lord-keeper is conſtituted by the delivery of the great ſeal, *&c.*

KEEPER *of the privy ſeal*, is alſo a lord by his office, thro' whoſe hands all grants, pardons, *&c.* paſs before they come to the great ſeal, and even ſome things paſs this officer's hands which do not paſs the great ſeal at all. This officer is alſo one of the privy-council, yet was antiently called clerk of the privy ſeal. His duty is to put the ſeal to no grant, *&c.* without a proper warrant, nor with warrant where it is againſt law, or inconvenient, but ſhall firſt acquaint the king therewith.

KEIL, a fortreſs ſituated on the Rhine, in the circle of Swabia, in Germany, oppoſite to Straſburg.

KEISERWAERT, a ſtrong town of Germany in the circle of Weſtphalia, and duchy of Berg, ſituated on the Rhine, twenty-five miles north of Cologn: eaſt long. 6° 8′, north lat. 51° 20′.

KELLINGTON, a borough town of Cornwall, thirteen miles ſouth of Launceſton, which ſends two members to parliament.

KELP, a fixed ſalt, or particular ſpecies of pot-aſh, procured by burning the weed called kali. See the article KALI. Kelp, the ton, containing twenty hundred weight, each hundred weight containing 112 lb. pays on importation, 14s. $4\frac{35}{100}$d. and draws back on exportation 12s. $11\frac{25}{100}$d.

KELSO, a town of Scotland, in the ſhire of Mers, or Roxburgh, ſituated on the north ſide the Tweed, twenty miles ſouth weſt of Berwick.

KEMPTEN, a city of Germany, in the circle of Swabia, ſituated on the river Iſer: eaſt long. 10° 7′, north lat. 47° 38′.

KENDAL, a market-town of Weſtmoreland, twenty two miles ſouth-weſt of Appleby.

KENKS, in the ſea-language, doublings in a rope or cable, when handed in and out, ſo that it does not run eaſy; or when any rope makes turns or twiſts, and does not run free in the block, then it is ſaid to make kenks.

KENSINGTON, a pleaſant village in the county of Middleſex, two miles weſt of London; where is a royal palace, with large and fine gardens.

KENT, a county bounded by the river Thames, on the north; by the ocean, on the eaſt; by Suſſex, and the ſtraits of Dover, on the ſouth; and by Surrey on the weſt.

KERMAN, the capital of the province of Kerman, or Carimania, in Perſia: eaſt long. 56° 30′, north lat. 30′.

KERMES, according to the arrangement of Linnæus, is a ſpecies of the coccus. See the article COCCUS.

The female of this ſpecies, which is what we know by the name kermes in the ſhops, is, when full grown, of a roundiſh figure, and of a deep purpliſh blue colour, covered with a fine whitiſh or greyiſh duſt, like that on the ſurface of a ripe plum; in this ſtate it is not eaſy to diſtinguiſh its limbs, or indeed its natural form; its being diſtended by young at this period altering, and in a manner deſtroying, its figure. It adheres in this ſtate to the leaves and young ſhoots of the ilex, and is collected thence for the ſhops: before this period, it runs about on the branches, and has its form more regular. The male is a very ſmall fly, which would ſcarce be thought to belong to the ſame ſpecies, if it were not ſeen impregnating the females; its body is oblong, its head ſmall, its eyes little and black, and its wings whitiſh, and full of brown and ſomewhat rigid nerves. It is the female that is gathered for uſe.

Kermes, as brought to us, is a ſmall roundiſh body, of the bigneſs of a pea: when cut, it is found to be a mere membranaceous bag, containing a multitude of little diſtinct granules, which are ſoft and juicy. It is a very valuable commodity, and ſerves to two very great uſes; the dyers in ſcarlet finding it as valuable in their way, as the phyſicians in theirs. The kermes intended for the dyers is beſt kept whole, only deſtroying the principle of life in the eggs, by means of vinegar; but that intended for medicinal purpoſes, is more properly managed in another way: they are to be gathered when fully diſtended, and while yet perfectly covered with bloom, and are to be immediately put into a mortar, and bruiſed to pieces. After which they are to be ſet in a cool place for ſeven or eight hours, in which time their juice will be rendered much leſs tough and viſcuous than it was on the firſt bruiſing; after this, it is to be preſſed pretty ſtrongly, in order to get out the whole. The liquor thus drawn, is to be ſet by for ſome hours to ſettle; the clear juice is then to be decanted off, and an equal quantity of fine ſugar is to be added to it, with which it is to be boiled over a very gentle fire, to the conſiſtence of a ſyrup, which is called kermes-juice in the ſhops. It will keep a long time, and the confection of alkermes is generally made from it. See the article ALKERMES.

The kermes is in great eſteem as a reſtorative, and is ſaid to ſtrengthen the ſtomach, and aſſiſt digeſtion, at the ſame time that it invigorates and enlivens in an uncommon manner. It is alſo in great eſteem among the midwives, as a cordial and ſtrengthener for lying-in women, and as a preventer of abortions.

The people who prepare kermes for the dyers, often let the eggs hatch as they lie in drying, and then ſprinkling them with vinegar, they kill them, and form them into a ſort of cakes, which keep very well a long time.

KERMES-MINERAL, *pulvis carthuſianorum*, in pharmacy, a preparation of antimony, made up in the following manner. Take of antimony, four pounds; ſolution of fixt nitre per deliquium, one pound; rain water, three pounds; boil them two hours, and then filter the boiling decoction through paper; let it ſtand at reſt twenty-four hours, and it will let fall a yellowiſh or ſaffron-coloured powder, the fluid becoming clear. This fluid being then poured off by inclination, the powder muſt be waſhed by repeated affuſions of warm water, and four ounces of ſpirit of wine being burnt upon it, afterwards kept for uſe.

This powder, according to Quincy, is a moſt efficacious deobſtruent, and therefore extremely uſeful in ſcrophulous, obſtinate, ſcorbutic, and all ſuch caſes as ariſe from glandular obſtruction, as likewiſe in chloretic, cachectic, and hyſterical habits, where the vitiated craſis of the blood has impaired the vis vitæ, and debilitated the ſecretive powers: it has been recommended alſo in fevers; but the uſe of medicines of this claſs, is not yet enough authorized by experience, to render ſuch a practice eligible.

The doſes given, have been from one grain to four; but it is beſt to begin firſt with the ſmalleſt doſe, eſpecially with young perſons, as the force of its operation varies greatly in different conſtitutions.

KERNING, among ſalt-makers, the cryſtallizing of ſalt. See the article SALT.

KERRY, a county of Ireland, in the province of Munſter, bounded by the river Shannon, which divides it from Clare, on the north; by Limeric and Cork, on the eaſt; by another part of Cork on the ſouth; and by the Atlantic Ocean, on the weſt.

KESHITAH, in antiquity, the name of a jewiſh coin, otherwiſe called gerah. See the article COIN.

KESSEL, a town of Upper Gelderland, in the quarter of Ruremonde, ſituated on the river Meuſe: eaſt long. 6°, north lat. 51° 25.

KESTRIL, or KASTRIL, in ornithology,

the yellow-legged falcon, with a brown back, a ſpotted breaſt, and a rounded tail, with a broad black faſcia, towards the end. It is a very beautiful bird, about the ſize of a pigeon, and very bold. It is known among authors, by the names of tinnunculus and cenchris, and is alſo called in engliſh, the ſtannel or windhover. See plate CXLIX. fig. 5.

KESWICK, a market town of Cumberland, twenty-five miles ſouth weſt of Carliſle.

KETCH, in naval architecture, a veſſel with two maſts. See the article SHIP.

KETCH DOLT, a game with dice and tables, wherein the firſt throws, and lays down from the heap of men without the tables, more or leſs, according to what he threw, ſuppoſe ſice deuce; then if the other throw either ſice or deuce, and draw them not from his adverſaries tables to the ſame point in his own, but takes them from the heap, and lays the ace down, he is *dolted*; and ſo looſeth the game: nay, if he but touch a man of the heap, and then recollect himſelf, the loſs is the ſame. Good gameſters will never be *dolted*; in which caſe, they ſtrive who ſhall fill up their tables firſt, and he that bears them off firſt wins the game. See BACK-GAMMON.

KETTERING, a market-town of Northamptonſhire, ten miles north-eaſt of Northampton.

KETTERINGSTONE, in the hiſtory of foſſils, the friable pſadurium, with a round gritt, being the ſubſtance ſo much talked of in the world under this name, though it is an erroneous one, it not being found about Kettering in Northamptonſhire, but about Ketton, a ſmall town in Rutland. See the article STONE.

It is a very remarkable and beautiful ſtone, of a lax texture, and appears where broken of a cavernous or porous ſtructure; but this is not really the caſe, the cavities ſeen there being not originally in the ſtone, but made by falling out of the inner part of its gritt, which is uſually looſe, and falls out as ſoon as its containing ſhell is broken. It is of a duſky browniſh white colour, and is compoſed of a roundiſh gritt laid very cloſely together, and ſurrounded with a cementitious matter of a terrene ſpar. It is not only found about Ketton, but in many other parts of the kingdom; and is uſed in many places in building. See the article PORTLAND-STONE.

KETTLE, a well known mettaline veſſel, for boiling any thing in.

KETTLE-DRUMS, in the art of war. See the article DRUM.

KETTON-STONE, the ſame with Ketteringſtone. See KETTERING-STONE.

KEVEL, in ſhip-building, a piece of plank ſayed againſt the quickwork on the quarter-deck, in the ſhape of a ſemicircle; about which the running rigging is belaid. See plate CXLIX. fig. 4.

KEXHOLME, the capital of the province of the ſame name in Finland, ſituated on the lake Ladoga, eighty miles north of Peterſburg: eaſt long. 30°, north lat. 61° 30′.

KEY, *clavis*, a well known inſtrument, for opening and ſhutting the locks of doors, cheſts, buroes, and the like. See the article LOCK.

The names of the ſeveral parts of a key are theſe: A (plate CXLIX. fig. 3.) is the pin-hole, drilled into the end of the ſhank H; B is the ſtep, or dap-ward; C, the hock-ward; D, the middle-ward; E E the croſs-ward; F, the main-ward; G G, croſs-wards; I, the pot; K, the bow-ward; L, the bow, or handle; and B F E D, *&c.* the piece of ſteel containing the wards, is called the bit of the key.

Keys are prohibited to be imported.

KEY, in muſic, a certain fundamental note, or tone, to which the whole piece, be it in concerto, ſonata, cantata, *&c.* is accommodated, and with which it uſually begins, but always ends. See CLEF.

To get an idea of the uſe of the key, it may be obſerved, that as in an oration there is a ſubject, *viz.* ſome principal perſon or thing to which the diſcourſe is referred, and which is always kept in view, that nothing unnatural or foreign to the ſubject may be brought in, ſo in every regular piece of muſic, there is one ſound, *viz.* the key, which regulates all the reſt. Again, as in an oration there are ſeveral diſtinct articles, which all refer to different ſubjects, yet ſo as they may have a viſible connection with the principal ſubject, which regulates and influences the whole; ſo in muſic, there may be various ſubaltern ſubjects, that is various keys, to which the different parts of the piece may belong: but then they muſt be all under the influence of the firſt and principal key, and have a ſenſible connection with it.

Now to give a more diſtinct notion of the key, we muſt obſerve, that the octave contains in it the whole principles of muſic, both with reſpect to conſonance and melody; and that if the ſcale be continued to a double octave, there will in that caſe be ſeven different orders of the degrees of an octave, proceeding from the ſeven different letters, with which the terms of the ſcale are marked. Any given ſound therefore, *i. e.* a ſound of any determinate pitch of tune, may be made the key of the piece, by applying it to the ſeven natural notes ariſing from the diviſion of an octave, and repeating the octave above and below at pleaſure: the given note is applied as the principal note or key to the piece, by making frequent cloſes or cadences upon it; and in the progreſs of the melody, no other than theſe ſeven natural ſounds can be admitted, while the piece continues in that key.

Here too it muſt be added with reſpect to the two different diviſions of the octave, that a ſound may belong to the ſame key, that is, have a juſt muſical relation to the ſame fundamental in the one kind of diviſion, and be out of the key in reſpect of the other. Now a piece of muſic may be carried through ſeveral keys, that is, it may begin in one key, and be led out of that into another, by introducing ſome ſound foreign to the firſt, and ſo on to another: but a regular piece of muſic muſt not only return to the firſt key, but thoſe keys too muſt have a particular connection with the firſt. It may be added, that thoſe other keys muſt be ſome of the natural ſounds of the principal key, though not any of them at pleaſure.

From the diſtinction already obſerved, it is evident, that there are but two different ſpecies of keys, which ariſe according as we join the greater or leſſer third, theſe being always accompanied with the ſixth and ſeventh of the ſame ſpecies; the third greater, for inſtance, with the ſixth and ſeventh greater, and the third leſſer with the ſixth and ſeventh leſſer. And this diſtinction is expreſſed under the name of a ſharp key, which is that with the third greater, *&c.* and the flat key with the third leſſer, *&c.* whence it is plain, that how many different caſes ſoever there be in a piece, there can be but two keys, if we conſider the eſſential difference of keys; every key being either flat or ſharp, and every ſharp key being the ſame as to melody, as well as a flat one. See the articles MODULATION, and HARMONY.

To diſtinguiſh accurately between a mode and a key, Mr. Malcolm has given us this definition, *viz.* An octave with all its natural and eſſential degrees, is a mode with reſpect to the conſtitution or manner of dividing it: but with reſpect to its place in the ſcale of muſic, it is a key. See MODE and MELODY.

KEY, is alſo uſed for an index, or explanation of a cipher. See CIPHER.

KEYS *of an organ, harpſichord,* &c. thoſe little pieces in the forepart of thoſe inſtruments, by means whereof the jacks play, ſo as to ſtrike the ſtrings. Theſe are in number twenty-eight, or twenty-nine. In large organs, there are ſeveral ſets of the keys, ſome to play the ſecondary organ, ſome for the main body, ſome for the trumpet, and ſome for the echoing trumpet, *&c.* in ſome there are but a part that play, and the reſt are only for ornament. There are twenty ſlits in the large keys, which make half notes. See the article ORGAN, *&c.*

KEY-STONE of an arch, or vault, that placed at the top or vertex of an arch, to bind the two ſweeps together.

This, in the tuſcan and doric orders, is only a plain ſtone, projecting a little; in the ionic, it is cut and waved ſomewhat like conſoles; and, in the corinthian and compoſite orders, it is a conſole, enriched with ſculpture.

Key-ſtones made in the manner of conſoles, and placed projecting in the middle of arches and porticos, are particularly deſigned to ſuſtain the weight and preſſure of the entablature, where it happens to be very great between the columns; for which reaſon, they ſhould be made ſo as to be a real ſupport, and not ſtand for mere ornaments, as they too frequently do.

KIAM, a great river of China, which, taking its riſe near the weſt frontier, croſſes the whole kingdom eaſtward, and falls into the bay or gulph of Nanking, a little below that city.

KIAMSI, a province of China, bounded by that of Nanking on the north, and by that of Canton on the ſouth.

KIDDERMINSTER, a market-town twelve miles north of Worceſter.

KIDNEYS, *renes*, in anatomy, are two red viſcera of an oblong figure, ſituated at the loins, one on each ſide; their hollow ſide being turned inward, and their convex ſide outward. They are placed near the loweſt ſpurious ribs; but their ſituation is not exactly regular; for in ſome ſubjects they are a little higher, and in others a little lower; and one of them is not unfrequently placed a little above the other: it is not always the ſame kidney that is placed higheſt; but ſometimes the right, and ſometimes the left; however, they are ſometimes perfectly even.

The kidneys are connected with the loins, the lower ribs, the colon, the ſuccenturiati, the renal veſſels, and the ureters. They have two membranes, the one robuſt and common, called the adipoſe membrane: this ſurrounds them but looſely, and is furniſhed with its own proper veſſels. The other membrane is proper, and is very thin, and every where applied cloſely to the ſubſtance of the kidneys.

The length of the kidneys is five or ſix fingers, the breadth three, and the thickneſs about a finger and a half. Its ſurface, in adults, is ſmooth and equal; but in the fœtus in human ſubjects, and in grown animals of many kinds, it is irregularly divided, as it were, into a number of lobes.

The veſſels of the kidneys, are, like thoſe of the liver, included in a membrane, from the peritonæum. The arteries and veins are large, and called emulgents, and venal veſſels; theſe are produced from the aorta and vena cava. The nerves are from the plexus renalis; and there is a large excretory duct, called the ureter. There are alſo a number of lymphatics, paſſing to the receptaculum chyli. The ſubſtance of the kidneys is firm and hard, and is of two kinds. 1. The exterior, or cortical, which, according to Malpighi, is glandulous; but according to the diſcoveries of Ruyſch, is throughout elegantly vaſculous. 2. The interior, which is tubulous, and expreſſed by the name of tubuli urinarii Bellini: this terminates in ten or twelve papillæ, which open by a multitude of apertures into the pelvis; but theſe papillæ are not found in all ſubjects.

The uſe of the kidneys is to ſecrete the urine from the blood, into the pelvis. See the articles PELVIS, SUCCENTURIATI, URETERS, BLADDER, and URETHRA. In plate CL. fig. 1. are repreſented the kidneys, glandulæ ſuccenturiatæ, bladder, and male organs of generation, with their veſſels. A, A, are the kidneys; B, B, the glandulæ ſuccenturiatæ; C, C, the emulgent veſſels, together with thoſe diſtributed over the membranes of the kidneys; D, D, the hypogaſtric veſſels, which branching off from the iliacs, are diſtributed in the urinary bladder and penis; E, E, the courſe of the ureters; F, F, the courſe of the ſpermatic veſſels, in which ſeveral appear cut off, being thoſe diſtributed in the peritonæum; G, the urinary bladder; H, H, the vaſa deferentia; I, I, the teſticles; K, the urachus cut off; L, the penis; M, M, the erector-muſcles.

Inflammation of the KIDNEYS. See the article NEPHRITIS.

KIDWELLY, a market-town of Caermarthen, in South Wales; ſituated on the Briſtol-channel, ſeven miles ſouth of Caermarthen.

KIEL, a city of the dutchy of Holſtein, in Germany, ſituated on a bay of the Baltic ſea, fifty miles north of Hamburg, eaſt long. 10°, north lat. 54° 32′.

KIGGELARIA, in botany, a genus of the dioecia decandria claſs of plants, in which the corolla of both the male and female flower conſiſt of five lanceolated, hollow petals; and its fruit is a coriaceous globoſe and unilocular capſule, containing a number of roundiſh ſeeds.

KILDARE, the capital of a county of the ſame name, in Ireland, twenty-ſeven miles ſouth-weſt of Dublin.

KILDERKIN, a liquid meaſure, containing two firkins. See the articles FIRKIN and MEASURE.

KILGARREN, a market-town of Pembrokeſhire, in South Wales; ſituated twenty-five miles north of Pembroke.

KILHAM, a market-town of the eaſt-riding of Yorkſhire, thirty miles north-eaſt of York.

KILKENNY, a county of Ireland, in the province of Leinſter, bounded by Queen's County, on the north; by the county of Wexford, on the eaſt; by Waterford, on the ſouth; and by the county of Tipperary, on the weſt. It is alſo the name of the capital of that county, and is ſituated in weſt long. 7° 15′, north lat. 52° 30′.

KIMBOLTON, a market-town of Huntingtonſhire, nine miles ſouth-weſt of Huntington.

KINDRED, in law, perſons related to another, whereof the law of England reckons three degrees or lines, *viz.* the deſcending, aſcending, and collateral line. See LINE, DEGREE, DIRECT, *&c.*

On there being no kindred in the deſcending line, the inheritance paſſes to the

Fig. 1. The KIDNEYS, &c.

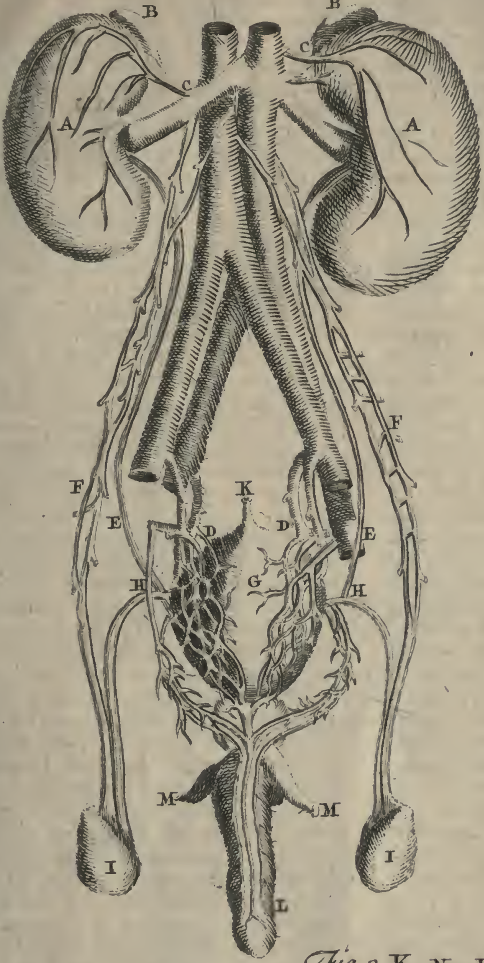


Fig 2 LUXATION of the KNEE.

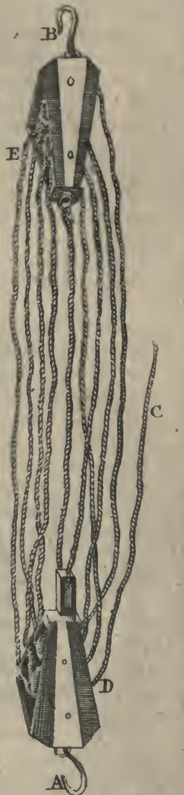
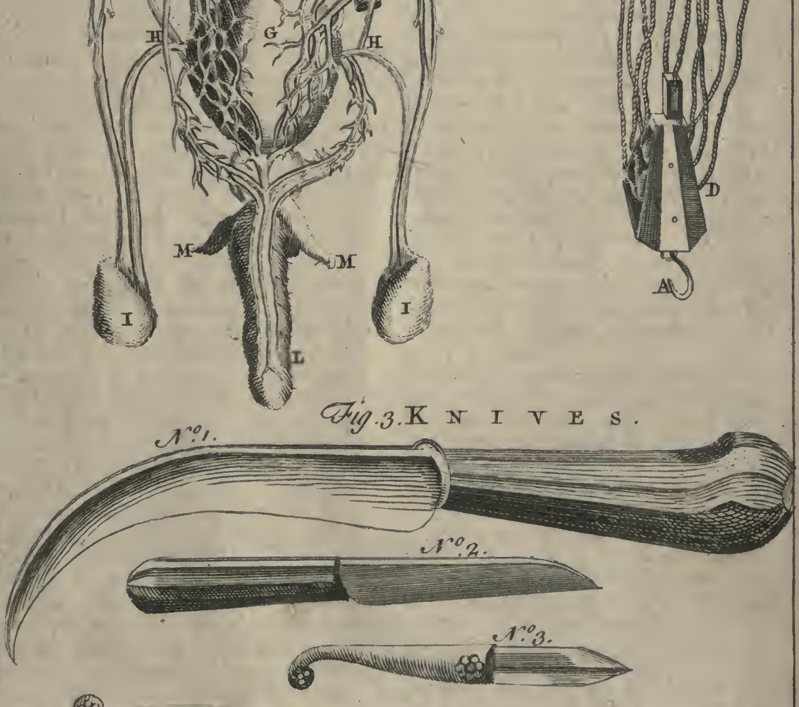


Fig. 3. KNIVES.



J. Jefferys sculp

the collateral one. See INHERITANCE.

KING, in the general acceptation of the word, is a perſon who has a ſupreme authority, with the power of levying taxes, making laws, and enforcing an obedience to them: but in England, which is a limited monarchy, the power of the king is greatly reſtrained; which is ſo far from diminiſhing his honour, that it adds a glory to his crown; for while other kings are abſolute monarchs over innumerable multitudes of ſlaves, the king of England has the diſtinguiſhed glory of governing a free people, the leaſt of whom is protected by the laws: he has great prerogatives, and a boundleſs power in doing good; and is at the ſame time only reſtrained from acting inconſiſtently with his own happineſs, and that of his people. He has all the enſigns of royalty, and all the marks of ſovereignty: but while he has the power of making treaties, of ſending and receiving ambaſſadors, of conferring titles of honour, creating privy counſellors, officers of ſtate, and judges, and may raiſe men and arms both for ſea and land, he cannot force his ſubjects to maintain them, or raiſe one tax by his ſole authority: he has the privilege of coining money, but he cannot force the meaneſt ſubject to part with his property: he can pardon a criminal, but he cannot put a ſubject to death, till he is condemned by his peers: he may at his pleaſure call, continue, prorogue, and diſſolve parliaments, and without his royal aſſent no bill in parliament can paſs into a law; yet he can neither act contrary to law, nor make new laws by his ſole authority; on the contrary, he may even be ſued and caſt in his own courts. At his coronation, he takes an oath to govern his people according to the ſtatutes agreed on in parliament, to cauſe law and juſtice in mercy to be executed in all his judgments; to maintain, as much as in him lies, the laws of God, the true profeſſion of the Goſpel, and the proteſtant reformed religion by law eſtabliſhed, and to preſerve to the biſhops and clergy all their rights and privileges. But tho' he may mitigate the rigour of the law, and forgive offenders, he cannot pardon murder, where an appeal is brought by the ſubject; nor any other crime, when the offender is impeached by the houſe of commons. He may lay an embargo on ſhipping, but then it ought to be for the public good, and not for the private advantage of any particular traders. Writs, proceſſes, commiſſions, *&c.* are in his name; and he has a power not only to make courts, but to create univerſities, colleges, and boroughs, to incorporate a city or town, and to grant franchiſes to ſuch corporations; but they muſt not, under colour thereof, ſet up a monopoly. He is eſteemed the head of the church; in him is lodged the ſupreme right of patronage throughout England, and he may be the founder as well as patron of biſhoprics. But notwithſtanding theſe and other prerogatives, the king can take what he has a right to, only by due courſe of law. In ſhort, he has a principal ſhare in the legiſlative power, and the whole executive power is lodged in him; he is ſuppoſed preſent in all his courts, he can do no wrong, and, according to the laws of England, he never dies.

KING *at arms*, or *of arms*, an officer who directs the heralds, preſides at their chapters, and has the juriſdiction of armory. See the articles HERALD and ARMS.

There are three kings of arms in England, namely, garter, clarencieux, and norroy.

Garter principal KING *at arms*. He, among other privileges, marſhals the ſolemnities at the funerals of the prime nobility, and carries the garter to kings and princes beyond ſea, being joined in commiſſion with ſome peer of the kingdom. See the article GARTER.

Clarencieux KING *at arms*, ſo called from the duke of Clarence to whom he firſt belonged. He marſhals the funerals of baronets, knights, eſquires, and gentlemen on the ſouth-ſide of the Trent. See the article CLARENCIEUX.

Norroy KING *at arms*, does the ſame on the north ſide of Trent; and theſe two laſt are called provincial heralds, as dividing the kingdom between them into two provinces.

Theſe, by charter, have power to ſet down noblemens pedigrees, diſtinguiſh their arms, appoint perſons their arms, and, with garter, direct the other heralds. Latterly the earl marſhal of England, by ſpecial commiſſion, to perſonate the king, creates the kings at arms.

Lyon KING *at arms*, for Scotland, is the ſecond king at arms for Great-Britain; he is inveſted and ſolemnly crowned. He publiſhes the king's proclamations, marſhals funerals, reverſes arms, appoints meſſengers at arms, *&c.* See the article COLLEGE *of Heralds*.

KING *of the Romans*. See ROMAN.

KING'S BENCH, a court in which the king was formerly accuſtomed to ſit in perſon, and on that account was moved with the king's houſhold. This was originally the only court in Weſtminſter-hall, and from this it is thought that the courts of common pleas and exchequer were derived. As the king in perſon is ſtill preſumed in law to ſit in this court, though only repreſented by his judges, it is ſaid to have ſupreme authority, and the proceedings in it are ſuppoſed to be coram nobis, that is, before the king. This court conſiſts of a lord chief juſtice and three other juſtices or judges, who are inveſted with a ſovereign juriſdiction over all matters, whether of a criminal or public nature. All crimes againſt the public good, though they do not injure any particular perſon, are under the cognizance of this court; and no private ſubject can ſuffer any unlawful violence or injury againſt his perſon, liberty, or poſſeſſions, but a proper remedy is afforded him here; not only for ſatisfaction of damages ſuſtained, but for the puniſhment of the offender: and wherever this court meets with an offence contrary to the firſt principles of juſtice, it may puniſh it. It frequently proceeds on indictments found before other courts, and removed by certiorari into this. Perſons illegally committed to priſon, though by the king and council, or either of the houſes of parliament, may be bailed in it; and in ſome caſes, even upon legal commitments. Writs of mandamus are iſſued by this court, for the reſtoring of officers in corporations, *&c.* unjuſtly turned out, and freemen wrongfully diſfranchiſed.

The court of king's bench is now divided into a crown ſide and plea-ſide; the one determining criminal, and the other civil cauſes: in the firſt it determines criminal matters of all kinds, where the king is plaintiff; ſuch as treaſons, felonies, murders, rapes, robberies, riots, breaches of the peace, and all other cauſes that are proſecuted by indictment, information, *&c.* On the plea-ſide, it determines all perſonal actions commenced by bill or writ; as actions of debt, upon the caſe, detinue, trover, ejectment, treſpaſs, waſte, *&c.* againſt any perſon in the cuſtody of the marſhal of the court, as every perſon ſued here is ſuppoſed to be by law.

The officers of this court on the crown-ſide are the clerk and ſecondary of the crown; and on the ſide of the pleas there are two chief clerks or prothonotaries, and their ſecondary and deputy, the cuſtos brevium, two clerks of the papers, the clerk of the declarations, the ſigner and ſealer of bills, the clerk of the rules; clerk of the errors, and clerk of the bails; to which may be added the filazers, the marſhal of the court, and the cryer.

Books of **KINGS**, two canonical books of the Old Teſtament, ſo called becauſe they contain the hiſtory of the kings of Iſrael and Judah, from the beginning of the reign of Solomon, down to the babyloniſh captivity, for the ſpace of near ſix hundred years. The firſt book of Kings contains the latter part of the life of David, and his death; the flouriſhing ſtate of the Iſraelites under Solomon, his building and dedicating the temple of Jeruſalem, his ſhameful defection from the true religion, and the ſudden decay of the jewiſh nation after his death, when it was divided into two kingdoms: the reſt of the book is taken up in relating the acts of four kings of Judah and eight of Iſrael. The ſecond book, which is a continuation of the ſame hiſtory, is a relation of the memorable acts of ſixteen kings of Judah, and twelve of Iſrael, and the end of both kingdoms, by the carrying of the ten tribes captive into Aſſyria by Salmanaſſar, and the other two into Babylon by Nebuchadnezzar.

It is probable that theſe books were compoſed by Ezra, who extracted them out of the public records, which were kept of what paſſed in that nation.

KING'S COUNTY, a county of Ireland, in the province of Leinſter, bounded by Weſt-meath on the north, by the county of Kildare on the eaſt, by Queen's county and Tipperary on the ſouth, and by the river Shannon, which ſeparates it from Galway, on the weſt.

KING'S EVIL, *ſcrophula*, in medicine. See the article SCROPHULA.

KING-FISHER, *iſpida*, in ornithology. See the article ISPIDA.

KING'S SILVER, the money due to the king in the court of common-pleas, *pro licentia concordandi*, in reſpect of a licence there granted to any man, for levying a fine of lands or tenements to another perſon. See the article FINE.

KINGDOM, among chemiſts and writers of natural hiſtory, a term which they apply to each of the three orders or claſſes of natural bodies: animal, vegetable, and mineral. See the articles BODY, ANIMAL, VEGETABLE and FOSSIL.

KINGHORN, a town of Scotland, on the coaſt of Fife, nine miles north of Edinburgh.

KINGSTON, a market-town of Surry, ſituated on the river Thames, twelve miles weſt of London.

KINGSTON, a port-town of Jamaica, ſituated on the north ſide of the bay of Port-royal: weſt long. 77°, north lat. 17° 32′.

KINGSTON *upon Hull*. See HULL.

KINROSS, a town of Scotland, in the ſhire of Fife, ſituated on the lake of Loch-Leven, twenty miles north of Edinburgh.

KINSALE, a port-town of Ireland, in the county of Cork and province of Munſter, ſituated on the river Bandon, fourteen miles ſouth of the city of Cork: weſt long. 8° 20′, and north lat. 51° 32′.

KIOF, or KIOW, the capital of the ruſſian Ukraine, on the frontiers of Poland: eaſt long. 30° 30′, and north lat. 51°.

KIPHONISM, or KYPHONISM. See the article KYPHONISM.

KIRK, a ſaxon term, ſignifying the ſame with church. See the article CHURCH.

KIRK-MOTE, a term formerly uſed for a ſynod. See the article SYNOD.

KIRK-OSWALD, a market-town of Cumberland, twelve miles ſouth of Carliſle.

KIRK-SESSIONS, an inferior church-judicatory, in Scotland, conſiſting of the miniſters, elders, and deacons of a pariſh. It regulates matters relating to public worſhip, catechiſing, viſitations, &c. and judges in caſes of fornication and leſſer ſcandals; but adultery, and the like, are left to the preſbytery. See the article PRESBYTERIANS.

KIRKALDY, a town of Fifeſhire, in Scotland, ten miles north of Edinburgh.

KIRKHAM, a market-town of Lancaſhire, ſixteen miles ſouth of Lancaſter.

KIRKUDBRIGHT, a parliament-town of Scotland, which ranks with Dumfries, Annan, &c. ſituated on a bay of the Iriſh ſea, ſixty miles weſt of Carliſle: weſt long. 4° 5′, and north lat. 54° 38′.

KIRKWALL, the capital of the Orkney-iſlands, and ſituated in that of Pomona, is a parliament-town, which claſſes with Dingwall, Tain, &c. weſt long. 25′, and north lat. 59° 45′.

KITCHEN, a room appropriated for dreſſing meat, and furniſhed with ſuitable accommodations and utenſils for that purpoſe.

Clerk of the KITCHEN, an officer of the king's houſhold, whoſe office is to buy proviſions.

KITCHEN-GARDEN, a piece of ground laid out for the cultivation of fruit, herbs, pulſe, and other vegetables uſed in the kitchen.

A kitchen-garden ought to be ſituated on one ſide of the houſe, near the ſtables, from whence the dung may be eaſily conveyed into it; and after having built the wall, borders ſhould be made under them, which, according to Miller, ought to be eight or ten feet broad: upon thoſe borders expoſed to the ſouth, many ſorts of early plants may be ſown; and upon thoſe expoſed to the north, you may have ſome late crops, taking care not to plant any ſort of deep-rooting plants, eſpecially beans and peas, too near the fruit-trees. You ſhould next proceed to divide the ground into quarters; the beſt figures for theſe is a ſquare, or an oblong if the ground will admit of it; otherwiſe they may be of that ſhape which will be moſt advantageous to the ground: the ſize of theſe quarters ſhould be proportioned to that of the garden; if they are too ſmall, your ground will be loſt in walks, and the quarters being encloſed by eſpaliers of fruit-trees, the plants will draw up ſlender, for want of a more open expoſure. The walks ſhould alſo be proportioned to the ſize of the ground; theſe in a ſmall garden ſhould be ſix feet broad, but in a larger one ten; and on each ſide of the walk there ſhould be allowed a border three or four feet wide, between it and the eſpalier, and in theſe borders may be ſown ſome ſmall ſallads, or any other herbs that do not take deep root, or continue long: but theſe quarters ſhould not be ſown or planted with the ſame crops two years together. In one of theſe quarters, ſituated neareſt to the ſtables, and beſt defended from the cold winds, ſhould be the hot-beds, for early cucumbers, melons, &c. and to theſe there ſhould be a paſſage from the ſtables, and a gate through which a ſmall cart may enter. The moſt important points of general culture conſiſt in well digging and manuring the ſoil, giving a proper diſtance to each plant, according to their different growths, as alſo in keeping them clear from weeds; for this purpoſe you ſhould always obſerve to keep your dunghills clear from them; if this is not done, their ſeeds will be conſtantly brought in, and ſpread with the dung.

KITE, *milvus*. See MILVUS.

KLEINIA, or CACALIA, in botany, a genus of the ſyngeneſia polygamia claſs of plants, the compound flower of which is uniform, conſiſting of about twenty monopetalous infundibuliform floſcules, quinquedented at the limb; the ſtamina are five very ſhort filaments; and the ſeed is ſingle, and crowned with a ſimple downy filament.

KNAPWEED, Jacea, in botany, a ſpecies of centauria. See Centaurea.

KNARESBOROUGH, a borough-town in the north riding of Yorkſhire, fifteen miles north of York.

It ſends two members to parliament.

KNAVE, in old law-books, an appellation given to a man ſervant, or even to a male child.

KNAUTIA, in botany, a genus of the tetrandria monogynia claſs of plants, the compound flower of which is equal, whereas the proper corolla is unequal, monopetalous, and quadrifid at the limb, with a tube of the length of the cup: the ſeeds are ſingle, or one for each proper corolla, and tetragonal; they are hairy at the top, and contained in a common receptacle.

KNEE, *genu*, in anatomy, the articulation of the thigh and leg-bones. See the articles Femur, Tibia, Patella, &c. The two principal motions of this joint are flexion and extenſion: in the former of theſe the leg may be brought to a very acute angle with the thigh, by the condyles of the thigh-bone being round and ſmoothed ſo far backwards; and in performing this, the patella is pulled down by the tibia. When the leg is to be extended, the patella is drawn upwards, and the tibia forwards, by the extenſor-muſcles, which, by means of the protuberant joint, and this thick bone with its ligament, have the chord with which they act, at a conſiderable angle, and therefore act with advantage: but, in order that the body may be ſupported by a firm perpendicular column, they are reſtrained by the poſterior croſs-ligament, from pulling the leg farther than to a ſtraight line with the thigh; and when this is done, the thigh and leg are almoſt as immoveable as if they were one continued bone: but when the joint is a little bent, the poſterior ligament is relaxed, and the patella not tightly braced; therefore the ſuperficial cavities of the tibia will allow this bone to be moved a little to either ſide, or with a ſmall rotation; which is done by the motion of the external cavity backwards and forwards on the internal, which ſerves as a kind of axis. The rotation of the leg outwards, is of great advantage to us, in croſſing our legs on ſeveral neceſſary occaſions; though it is wiſely ordered by providence, that this motion ſhould not be very great, ſince this would have occaſioned frequent luxations. While all theſe motions are performing, the only part of the tibia that moves immediately on the condyles, is only ſo much as is within the cartilaginous rings, which by the thickneſs of their outſides, make the cavities of the tibia more horizontal, by raiſing their external ſide, where the ſurface of the tibia ſlants downwards; by which means the motions of this joint are more equal and ſteady than they would otherwiſe have been. The cartilages are fitted to do this good office in the different motions and poſtures of the member, by being capable of changing a little their ſituation; and this alſo contributes to make the motions larger and quicker.

Luxation of the Knee, in ſurgery, is the receding of the tibia from under the lower extremity of the thigh-bone; which happens ſometimes on the outſide, ſometimes on the inſide, and ſometimes backwards, but very rarely or never forwards, by reaſon the patella prevents it.

When the knee is but ſlightly luxated, the patient is to be ſeated on a bed, bench, or table, and one aſſiſtant is to hold the thigh firm above the knee, and the other to extend the leg, while the ſurgeon in the mean time replaces the bones by his hand and knee: but when this method is not ſufficient, ſurgeons make uſe of ſlings, pulleys, and other inſtruments. See plate CL. fig. 2. which repreſents a polyſpaſton, or compound pulley, A and B being two hooks, by which the inſtrument is faſtened on both ſides; C, the rope, by drawing which an extenſion is made in the luxated limb; and D and E, the two pullies, conſiſting of ſeveral wheels, whereby the force of the drawer is greatly increaſed. See the article Pully.

They ought, however, to be here very careful, leſt they make the extenſion ſo violent in children and young people, as to ſeparate the epiphyſes from the bones, to which they are not yet firmly united, for by that means a worſe diſorder and lameneſs will be brought on. After the luxation of the knee is rightly reduced, it is to be properly bound up, and placed in a ſtraw-caſe; and the reſt muſt be managed as in the luxation of the patella. See the article Patella.

Knee, in a ſhip, a crooked piece of timber, bent like a knee, uſed to bind the beams and futtocks together, by being bolted faſt into them both. Theſe are uſed about all the decks.

Carling-KNEES, in a ſhip, thoſe timbers which extend from the ſides to the hatchway, and bear up the deck on both ſides.

KNIFE, a well known inſtrument, made for cutting.

Surgeons have ſeveral kinds of knives; ſome for dividing the fleſh to the bone, in the upper and lower extremities; theſe are commonly falciform, or hooked, as repreſented in plate CL. fig. 3. n° 1. though Heiſter, in moſt caſes, prefers the ſmall ſtraight knife, *ibid.* n° 2. Other inciſion knives are double-edged, like that repreſented *ibid.* n° 3. and, finally, there are other leſſer falciform inciſion-knives, for cutting away excreſcences, which the others cannot conveniently reach. All ſorts of knives are prohibited to be imported.

KNIGHT, *eques*, among the Romans, a perſon of the ſecond degree of nobility, following immediately that of the ſenators. See EQUESTRIAN ORDER.

Part of the ceremony whereby this honour was conferred, was the giving of an horſe; for each had an horſe at the public charge, and received the ſtipend of a horſeman, to ſerve in the wars.

When the knights were taken in among the ſenators, they reſigned the privilege of having an horſe kept for them at the charge of the public: then it became neceſſary, in order to be a knight, that they ſhould have a certain revenue, that their poverty might not diſgrace the order; and when they failed of the preſcribed revenue, they were expunged out of the liſt of knights, and thruſt down among the plebeians. Ten thouſand crowns is computed to have been the revenue required.

The knights at length grew ſo very powerful, that they became a balance between the power of the ſenate and people: they neglected the exerciſes of war, and betook themſelves principally to civil employments in Rome.

KNIGHT, in a more modern ſenſe, properly ſignifies a perſon, who, for his virtue and martial proweſs, is by the king raiſed above the rank of gentlemen, into an higher claſs of dignity and honour.

Knighthood was formerly the firſt degree of honour in the army, and uſually conferred with a great deal of ceremony, on thoſe who had diſtinguiſhed themſelves by ſome notable exploit in arms: the ceremonies at their creation have been various; the principal was a box on the ear, and a ſtroke with a ſword on the ſhoulder; they put on him a ſhoulder-belt, and a gilt ſword, ſpurs, and other military accoutrements; after which being armed as a knight, he was led to the church in great pomp. Camden deſcribes the manner of making a knight-batchelor among us, which is the loweſt, though the moſt antient order of knighthood, to be thus: the perſon kneeling, was gently ſtruck on the ſhoulder by the prince, and accoſted in theſe words, "Riſe, or be a knight, " in the name of God." For the ſeveral kinds of knights among us, ſee the articles BATCHELOR, BANNERET, BARONET, BATH, GARTER, &c.

KNIGHT is alſo underſtood of a perſon admitted into any order, either purely military, or military and religious, inſtituted by ſome king or prince, with certain marks and tokens of honour and diſtinction, as the knights of the garter, knights of the thiſtle, knights of Malta, the knights of the Holy Ghoſt, &c. all which may be ſeen under their ſeveral heads.

KNIGHTS-ERRANT, a pretended order of chivalry, much talked of in old romances, being a kind of heroes that travelled the world in ſearch of adventures, redreſſing wrongs, reſcuing damſels, and taking all occaſions of ſignalizing their proweſs. Of this kind of knights was Don Quixote, the hero of a celebrated romance, known by that name. This romatic bravery of the old knights was heretofore the chimera of the Spaniards.

KNIGHTS *of the ſhire*, or KNIGHTS *of parliament*, in the britiſh polity, are two knights or gentlemen of eſtate, who are elected, on the king's writ, by the freeholders of every county, to repreſent them in parliament.

The qualifications of a knight of the ſhire, is to be poſſeſſed of 600 l. *per an.* in a freehold eſtate. Their expences during their ſitting, were, by a ſtatute of Hen. VIII. to be defrayed by the county; but this is now ſcarce ever required.

KNIGHT-MARSHAL, an officer in the king's houſhold, who has juriſdiction and cognizance of any tranſgreſſion within the king's houſhold and verge; as alſo of contracts made there, whereof one of the houſe is party.

KNIGHTS, in a ſhip, two thick ſhort pieces of wood, commonly carved like a man's head, having four ſhivers in each, three for the halyards, and one for the top-ropes to run in: one of them ſtands faſt bolted on the beams abaſt the foremaſt, and is therefore called the fore-knight; and the other, ſtanding abaſt the main-maſt, is called the main knight.

KNOT, a part of a tree, from which ſhoots out branches, roots, or even fruit. The uſe of the knots of plants, is to ſtrengthen the ſtem: they ſerve alſo as ſearces, to filtrate, purify, and refine the juices raiſed up for the nouriſhment of the plant.

KNOTS *of a rope*, among ſeamen, are diſtinguiſhed into three kinds, *viz.* whole-knot, that made ſo with the lays of a rope that it cannot ſlip, ſerving for ſheets, tacks, and ſtoppers: bow-link knot, that ſo firmly made, and faſtened to the cringles of the ſails, that they muſt break or the ſail ſplit before it ſlips: and ſheep-ſhank-knot, that made by ſhortening a rope without cutting it, which may be preſently looſened, and the rope not the worſe for it.

KNOT *of the log line*, at ſea, are the diviſions of it. See the article LOG.

KNOWLEDGE, is defined, by Mr. Locke, to be the perception of the connection and agreement, or diſagreement and repugnancy, of our ideas. See IDEA.

In the introduction to this work, we have given a general diſtribution of knowledge, according to its objects; and ſhall here conſider it with regard to its foundation, degrees, extent, reality, and manner of improvement.

Foundation and degrees of KNOWLEDGE. There are ſeveral ways wherein the mind becomes poſſeſſed of truth, each of which is called knowledge.

1. There is actual knowledge, when the mind has a preſent view of the agreement or diſagreement of any of its ideas, or of the relations they have one with another. This is called intuitive knowledge; and whatever is deduced from our intuitive perceptions, by a clear and connected ſeries of proofs, is ſaid to be demonſtrated, and produces abſolute certainty in the mind: and hence the knowledge, obtained in this manner, is called ſcience, becauſe, in each ſtep of the procedure, it carries its own evidence along with it, and leaves no room for doubt or heſitation. And what is highly worthy of notice, as the truths of this claſs expreſs the relations between our ideas, and the ſame relations muſt ever and invariably ſubſiſt between the ſame ideas, our deductions in the way of ſcience, conſtitute what we call eternal, neceſſary, and immutable truths. If it be true that the whole is equal to all its parts, it muſt be ſo unchangeably; becauſe the relation of equality being attached to the ideas themſelves, muſt ever intervene where the ſame ideas are compared. Of this nature are all the truths of natural religion, morality and mathematics, and in general, whatever may be gathered from the bare view and conſideration of our ideas. See INTUITION and DEMONSTRATION.

2. Another ground of human knowledge is experience; from which we infer the exiſtence of thoſe objects that ſurround us, and fall under the immediate notice of our ſenſes. When we ſee the ſun, or caſt our eyes towards a building, we not only have ideas of thoſe objects within ourſelves, but aſcribe to them a real exiſtence out of the mind. It is alſo by the information of the ſenſes, that we judge of the qualities of bodies; as when we ſay that ſnow is white, fire hot, or ſteel hard. For as we are wholly unacquainted with the internal ſtructure and conſtitution of the bodies that produce theſe ſenſations in us, nay, and are unable to trace any connection between that ſtructure and the ſenſations themſelves, it is evident, that we build our judgments altogether upon obſervation, aſcribing to bodies ſuch qualities as are anſwerable to the perceptions they excite in us. But this is not the only advantage derived from experience, for to that too we are indebted for all our knowledge regarding the co-exiſtence of ſenſible qualities in objects, and the operations of bodies one upon another. Ivory, for inſtance, is hard and elaſtic; this we know by experience, and, indeed, by that alone: for being altogether ſtrangers to the true natue both of elaſticity and hardneſs, we cannot, by the bare contemplation of our ideas, determine how far the one neceſſarily implies the other, or whether there may not be a repugnance between them: but when we obſerve them to exiſt both in the ſame object, we are then aſſured, from experience, that they are not incompatible; and when we alſo find that a ſtone is hard and not elaſtic, and that air, though elaſtic, is not hard, we alſo conclude, upon the ſame foundation, that theſe ideas are not neceſſarily conjoined, but may exiſt ſeparately in different objects. In like manner, with regard to the operations of bodies one upon another, it is evident, that our knowledge this way is all derived from obſervation. Aqua-regia

diſſolves gold, as has been found by frequent trial, nor is there any other way of arriving at the diſcovery. Naturaliſts may tell us, if they pleaſe, that the parts of aqua-regia are of a texture apt to inſinuate between the corpuſcles of gold, and thereby looſen and ſhake them aſunder. If this be a true account of the matter, I believe it will, notwithſtanding, be allowed, that our conjecture in regard to the conformation of theſe bodies, is deduced from the experiment, and not the experiment from the conjecture. To this head we may likewiſe refer whatever knowledge ariſes from teſtimony. See the article EXPERIMENTAL PHILOSOPHY.

3. A third foundation of knowledge is memory: when a man, having once evidently perceived certain truths, he ever afterwards readily aſſents to them whenever they come to be reflected on. This may be called habitual knowledge, whereby a man may be ſaid to know all thoſe truths which are lodged in his memory, by a former, clear and full perception; and is of two ſorts: the one is of ſuch truths laid up in the memory, as whenever they occur to the mind, it actually perceives the relation there is between thoſe ideas; and this is in all thoſe truths where the ideas themſelves, by an immediate view, diſcover their agreement or diſagreement one with another. The other is of ſuch truths, of which the mind having been convinced, it retains the memory of the conviction without the proofs. Thus a man that remembers certainly, that he once perceived the demonſtration that the three angles of a triangle are equal to two right ones, knows it to be true when that demonſtration is gone out of his mind, and poſſibly cannot be recollected; but he knows it in a different way from what he did before; namely, not by the intervention of thoſe intermediate ideas whereby the agreement or diſagreement of thoſe in the propoſition was at firſt perceived; but by remembring, that is knowing, that he was once certain of the truth of this propoſition, that the three angles of a triangle are equal to two right ones. The immutability of the ſame relations between the ſame immutable things, is now the idea that ſhews him, that if the three angles of a triangle were once equal to two right ones, they will always be ſo. And hence he comes to be certain, that what was once true is always true; what ideas once agreed will always agree; and conſequently, what he once knew to be true, he will always know to be true as long as he can remember that he once knew it.

Extent and limits of human KNOWLEDGE. 1. It is evident that we can have no knowledge farther than we have perception of the agreement or diſagreement of our ideas, whether by intuition, demonſtration, or ſenſation. 2. We cannot have an intuitive knowledge that ſhall extend itſelf to all our ideas and all that we know about them, becauſe we cannot examine and perceive all the relations they have to each other; thus we cannot intuitively perceive the equality of two extenſions, the difference of whoſe figures makes their parts incapable of an exact immediate application. 3. Demonſtrative knowledge cannot reach to the whole extent of our ideas, becauſe we cannot always find ſuch proofs as will connect them together, with an intuitive knowledge in all the parts of the deduction. Thus, though we have the ideas of a ſquare, a circle, and equality, yet we, perhaps, ſhall never be able to find a ſquare exactly equal to a circle. The affirmations, or negations we make concerning the ideas we have, being reduced by Mr. Locke to theſe four, *viz.* identity, co-exiſtence, relation and real exiſtence, he examines how far our knowledge extends to each of theſe.

1. As to identity and diverſity, our intuitive knowledge is ſo far extended as our ideas themſelves, and there can be no idea in the mind which it does not preſently, by an intuitive knowledge, perceive to be what it is, and to be different from any other.

2. As to the agreement or diſagreement of our ideas of coexiſtence, our knowledge herein is very defective, though the greateſt and moſt material part of our knowledge concerning ſubſtances conſiſts in it. As to the powers of ſubſtances, which makes a great part of our enquiries about them, our knowledge reaches little further than experience, becauſe they conſiſt in a texture and motion of parts which we cannot by any means come to diſcover.

3. As to the third ſort, the agreement or diſagreement of our ideas in any other relation; this is the largeſt field of knowledge, and it is hard to determine how far it may extend. This part depending on our ſagacity in finding intermediate ideas, that may ſhew the habi-

tudes and relations of ideas, it is difficult to tell when we are at an end in ſuch diſcoveries.

4. As to the fourth part of knowledge, *viz.* of the real actual exiſtence of things, we have an intuitive knowledge of our own exiſtence, a demonſtrative knowledge of the exiſtence of God, and a ſenſitive knowledge of the objects that preſent themſelves to our ſenſes. See the article EXISTENCE.

Reality of human KNOWLEDGE. It is evident, ſays Mr. Locke, that the mind knows not things immediately, but by the intervention of the ideas it has of them. Our knowledge therefore is real only ſo far as there is a conformity between our ideas and the reality of things. But how ſhall we know when our ideas agree with things themſelves? It is anſwered, there are two ſorts of ideas that we may be aſſured agree with things: theſe are,

1. Simple ideas; which, ſince the mind can by no means make to itſelf, muſt be the effect upon things operating upon the mind in a natural way, and producing therein thoſe perceptions which, by the will of our maker, they are ordained and adapted to. Hence it follows, that ſimple ideas are not fictions of our fancies, but the natural and regular productions of things without us really operating upon us, which carry with them all the conformity our ſtate requires, which is to repreſent things under thoſe appearances they are fitted to produce in us. Thus the idea of whiteneſs, as it is in the mind, exactly anſwers to that power which is in any body to produce it there. And this conformity between our ſimple ideas and the exiſtence of things, is ſufficient for real knowledge. See the article IDEA.

2. All our complex ideas, except only thoſe of ſubſtances, being archetypes of the mind's own making, and not referred to the exiſtence of things as to their originals, cannot want any conformity neceſſary to real knowledge.

3. But the complex ideas which we refer to archetypes without us, may differ from them, and ſo our knowledge about them may come ſhort of being real, and ſuch are our ideas of ſubſtances. Theſe muſt be taken from ſomething that does or has exiſted, and not be made up of ideas arbitrarily put together, without any real pattern. Herein, therefore, is founded the reality of our knowledge concerning ſubſtances, that all our complex ideas of them muſt be ſuch, and ſuch only, as are made up of ſingle ones, as have been diſcovered to co-exiſt in nature; and our ideas being thus true, tho' not perhaps very exact copies, are the ſubjects of real knowledge of them. Whatever ideas we have, the agreement we find they have with others, will be knowledge: if thoſe ideas be abſtract, it will be general knowledge; but to make it real concerning ſubſtances, it muſt be taken from the real exiſtence of things: wherever therefore we perceive the agreement or diſagreement of our ideas, there is certain knowledge, and wherever we are ſure theſe ideas agree with the reality of things, there is certain real knowledge.

Improvement of human KNOWLEDGE. The ſentiments of the ſame author upon the improvement of our knowledge are as follow: it being the received opinion among men of letters, that maxims are the foundations of all knowledge, and that ſciences are each of them built upon certain præcognita, from whence the underſtanding was to take its riſe, and by which it was to conduct itſelf in its enquiries in the matters belonging to that ſcience, the beaten road of the ſchools was to lay down, in the beginning, one or more general propoſitions called principles or foundations, whereon to build the knowledge that was to be had of that ſubject.

That which gave occaſion to this way of proceeding, he ſuppoſes to have been the good ſucceſs it ſeemed to have in the mathematics, which of all other ſciences have the greateſt clearneſs, certainty, and evidence in them; but if we conſider it, we ſhall find that the great advancement and certainty of real knowledge men arrive at, in theſe ſciences, was not owing to the influence of theſe principles, but to the clear, diſtinct, and complete ideas their thoughts were employed about, and the relation of equality and exceſs ſo clear between ſome of them, that they had an intuitive knowledge, and by that a way to diſcover it in others, and this without the help of thoſe maxims. See the article AXIOM.

The way to improve in knowledge, is not to ſwallow principles with an implicit faith, and without examination, which would be apt to miſlead men, inſtead of guiding them into truth; but to get and fix in our minds clear and complete ideas, as far as they are to be had, and annex to them proper and conſtant names, and thus barely by conſidering our ideas, and comparing them together, and obſerving their agreement or diſagreement, their habitudes and relations, we ſhall get more true and clear knowledge by the conduct of this one rule, than by taking up principles, and thereby putting the mind into the diſpoſal of others.

We muſt, therefore, if we proceed as reaſon adviſes, adapt our methods of inquiry to the nature of the ideas we examine, and the truth we ſearch after. General and certain truths are only founded in the habitudes and relations of abſtract ideas; therefore a ſagacious methodical application of our thoughts, for the finding out theſe relations, is the only way to diſcover all that can with truth and certainty be put into general propoſitions. By what ſteps we are to proceed in theſe, is to be learned in the ſchools of the mathematicians, who from very plain and eaſy beginnings, by gentle degrees, and a continued chain of reaſonings, proceed to the diſcovery and demonſtration of truths, that appear at firſt ſight above human capacity. This may reaſonably be ſaid, that if other ideas, that are real as well as nominal eſſences of their ſpecies, were purſued in the way familiar to mathematicians, they would carry our thoughts farther, and with greater evidence and clearneſs, than probably we are apt to imagine.

In our knowledge of ſubſtances, we are to proceed in quite a different method; the bare contemplation of their abſtract ideas (which are but nominal eſſences) will carry us but a very little way in the ſearch of truth and certainty: here experience muſt teach us what reaſon cannot, and it is by trying alone that we can certainly know what other qualities coexiſt with thoſe of our complex idea; for inſtance, whether that yellow, heavy, fuſible body we call gold, be malleable or not, which experience (however it prove in that particular body we examine) makes us not certain that it is ſo in all or any other yellow, heavy, fuſible bodies, but that which we have tried; becauſe it is no conſequence, one way or other, from our complex idea. As far as our experience reaches, we may have certain knowledge, and no farther. It is not denied, but that a man accuſtomed to rational and regular experiments, ſhall be able to ſee farther into the nature of bodies and their unknown properties, than one that is a ſtranger to them; but this is only judgment and opinion, not knowledge and certainty. This makes our author ſuſpect that natural philoſophy is not capable of being made a ſcience from experiments and hiſtorical obſervations: we may draw advantages of eaſe and health, and thereby increaſe our ſtock of conveniencies for this life; but beyond this, he fears, our talents do not reach, and gueſſes that our faculties are not able to advance further. See the article EXPERIMENTAL PHILOSOPHY.

The ways to enlarge our knowledge as far as we are capable, ſeem, to be theſe two: the firſt is, to get and ſettle in our minds, as far as we can, clear, diſtinct, and conſtant ideas of thoſe things we would conſider and know. For it being evident, that our knowledge cannot exceed our ideas; where they are either imperfect, confuſed, or obſcure, we cannot expect to have certain, perfect, or clear knowledge. The other is the art of finding out the intermediate ideas, which may ſhew us the agreement or diſagreement, or repugnancy, of other ideas, which cannot be immediately compared. That theſe two, and not the relying on maxims, and drawing conſequences from ſome general propoſitions, are the right method of improving our knowledge in the ideas of other modes, beſides thoſe of quantity, the conſideration of mathematical knowledge will eaſily inform us; where we ſhall find, that he who has not clear and perfect ideas of thoſe angles or figures, of which he deſires to know any thing, is thereby utterly incapable of any knowledge about them.

Our knowledge, as in other things, ſo in this alſo, has ſo great a conformity with our ſight, that it is neither wholly neceſſary, nor wholly voluntary. Men that have ſenſes, cannot chooſe but receive ſome ideas by them; and if they have memory, they cannot but retain ſome of them; and if they have any diſtinguiſhing faculty, they cannot but perceive the agreement or diſagreement of ſome of them, one with another: as he that has eyes, if he will open them by day, cannot but ſee ſome objects, and perceive a difference in them, yet he may chooſe whether he will turn his eye towards an object, curiouſly ſurvey it, and obſerve accurately all that is viſible in it; but what he does ſee, he cannot ſee otherwiſe than he does: it depends not on his will to ſee that black, which appears yellow. Juſt thus it is with our underſtanding;

all that is voluntary in our knowledge is the employing or withholding any of our faculties from this or that ſort of objects, and a more or leſs accurate ſurvey of them; but they being employed, our will hath no power to determine the knowledge of the mind one way or other; that is done only by the objects themſelves, as far as they are clearly diſcovered.

Knowledge may be uſefully diſtinguiſhed, according to Wolfius, into three kinds; hiſtorical, philoſophical, and mathematical.

Hiſtorical knowledge is merely the knowledge of facts, or of what is or happens in the material world, or within our own minds. Thus, that the ſun riſes and ſets, that trees bud in the ſpring, that we remember, will, &c. are inſtances of hiſtorical knowledge. Philoſophical knowledge is the knowledge of the reaſons of things, or of what is or happens. Thus he has a philoſophical knowledge of the motion of rivers, who can explain how it ariſes from the declivity of the bottom, and from the preſſure which the lower part of the water ſuſtains from the upper. So likewiſe the ſhewing how, and by what reaſon, deſire or appetite ariſes from the perception or imagination of its object, would be philoſophical knowledge. Mathematical knowledge is the knowledge of the quantity of things, that is, of their proportions or ratios to ſome given meaſure. Thus he who knows the proportion of the meridian heat of the ſun at the ſummer ſolſtice to its meridian heat at the winter ſolſtice, might ſo far be ſaid to have a mathematical knowledge of the ſun's heat. So likewiſe he has a mathematical knowledge of the motion of a planet in its orbit, who can diſtinctly ſhew, how, from the quantity of the impreſſed and centripetal force, the velocity of the planet is produced; and how from the action of this double force, the elliptical figure of the orbit ariſes.

Theſe three kinds of knowledge differ evidently, it being one thing to know that a thing is; another, the reaſon why it is; and a third, to know its quantity or meaſure. It is alſo evident, that hiſtorical knowledge, though extenſively uſeful, and the foundation of the reſt, is the loweſt degree of human knowledge. Thoſe who aim at the greateſt certainty ought to join mathematical with philoſophical knowledge. Nothing can more evidently ſhew that an effect ariſes from a certain cauſe, than the knowledge that the quantity of the effect is proportional to the force of the cauſe. Beſides, there are many things in nature, the reaſons of which, depending on certain figures or quantities, are not aſſignable but from mathematical principles.

Philoſophical knowledge is attended with advantages not to be expected from mere hiſtory. See PHILOSOPHICAL.

KNOXIA, in botany, a genus of the tetrandria-monogynia claſs of plants, the flower of which conſiſts of a ſingle infundibuliform petal; and its ſeeds are two, and ſulcated.

KOMORRA, a city of Hungary, ſituated on the Danube, at the eaſt end of the iſland Schut, eaſt long. 28° 12′, north lat. 48° 10′.

KONINGSBURG, a city of Poland, the capital of Ducal Pruſſia and of the king of Pruſſia's Poliſh dominions, ſituated on the river Pregel, near a bay of the Baltic ſea, ſeventy miles north-eaſt of Dantzic: eaſt longitude 21°, and north latitude 54° 40′.

KONINGSGRATZ, a city of Bohemia, ſituated on the river Elbe, eaſt long. 15° 25′, north lat. 50° 15′.

KORAN, or ALCORAN. See ALCORAN.

KOS, in jewiſh antiquity, a meaſure of capacity, containing about 4 cubic inches: this was the cup of bleſſing, out of which they drank when they gave thanks after ſolemn meals, like that of the paſſover.

KOWNO, a city of Poland, in the dutchy of Lithuania, and palatinate of Troki, ſituated on the rivers Wilia and Niemen, eaſt long. 24°, north lat. 55° 5′.

KUFFSTAIN, a city of Germany, in the circle of Auſtria and county of Tyrol, ſituated on the river Inn, eaſt long. 12° 12′, north lat. 47° 32′.

KUR, the antient Cyrus, a river of Perſia, which riſes in the mountains of Georgia, and running ſouth-eaſt by Teflis, unites its ſtreams with the river Arras (the antient Arraxes) and falls into the Caſpian ſea, ſouth of Baku.

KYPHONISM, in antiquity, a kind of puniſhment, otherwiſe called cyphoniſm. See the article CYPHONISM.

KYSTIS, or CYSTIS, in anatomy. See the articles CYST and CYSTIS.

END of the SECOND VOLUME.

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